ON THE EXISTENCE OF GOD

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Franz Brentano

On the Existence of God

Lectures given at the Universities of Würzburg and Vienna (1868–1891)

Edited and Translated by Susan F. Krantz

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INTRODUCTION

Of the works by Franz Brentano (1838-1917) which have appeared in English thus far, perhaps none is better suited to convey a clear idea of the spirit of the man that this volume of his lectures on proving the existence of God. In order to understand his metaphysics, it would he better to read *The Theory of Categories*; in order to master the finer points of his psychology, it would be better to read *Psychology From an Empirical Standpoint*; in order to appreciate his ethical theory, it would be better to read *The Origin of Our Knowledge of Right and Wrong* or, for a more thorough treatment, *The Foundation and Construction of Ethics*. But in order to see what it was that gave Brentano the enthusiasm and dedication to do all that work and much more besides, it is necessary to find out what Brentano believed the philosophical enterprise itself to be; and this comes forth most vividly when he bends his philosophical efforts to the subject he considered most important of all, namely, natural theology. For, like Socrates, Brentano brought a kind of religious fervor to his philosophy precisely because he saw it as dealing much better than religion does with the matters that are closest to our hearts.

The lectures on natural theology which appear here as compiled and edited by Alfred Kastil were delivered over a period that includes most of Brentano's teaching career, beginning when he was still a Roman Catholic priest lecturing at Würzburg and extending through much of his twenty years at Vienna.[1] That his interest in the subject was an abiding one is evidenced by the short essay included at the end of the book, which he dictated in 1915, just two years before his death. Naturally, the developments in his thinking on other subjects affected his thinking on the subjects of the existence of God and our knowledge of God. Thus in certain places Kastil has altered the text of the earlier lectures to conform to Brentano's later theories. Such passages are identified in the editorial notes which appear at the end of the text.

Because the course of lectures is so long, it might be helpful to say a word about their overall plan and then about each of its stages. Brentano saw it as his first task to justify the philosophical inquiry into the question of God's existence, since someone could object either that proving God's existence is unnecessary or that it is impossible. This meant clearing away a lot of philosophical debris. Secondly he thought it essential to introduce a wealth of empirical data along with assessments of some of the attempts to deal with it theoretically. And finally he constructed or reconstructed four philosophical proofs of God's existence, based upon the data.

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[1] For details about Brentano's life, see Kraus and Stumpf in *The Philosophy of Brentano*, Ed. Linda McAlister, (Atlantic Highlands, NJ: Humanities Press, 1976).

Now an empirical proof based upon data is what Brentano sees as being required for the proof of God's existence, and so he begins, in the Preliminary Inquiries, by considering the ontological argument. It is, after all, an argument which would show that a proof in Brentano's sense is unnecessary, for if the argument is right then the proposition that God exists would be an analytic proposition and, as such, evident *a priori*. So he traces the history of the ontological argument from St. Anselm to Leibniz, considers the critiques by Hume and Kant, which he rejects, and comes to his own assessment of both the mistakes and the value of the argument. Since the ontological argument is considered by Brentano to be the best of the arguments against the necessity of proving God's existence, the refutation of it suffices at least to show that Brentano's enterprise is not superfluous. But what if the proof he wants is impossible?

In order to show that proving God's existence is indeed possible, Brentano enters into a thorough discussion of the objections raised by Kant and Hume against the traditional theistic proofs. In the end he demonstrates that neither Kant's transcendental idealism nor Hume's skepticism is sufficient to establish that the subject of God's existence is beyond the scope of philosophy. The empirically based proofs he wants to construct require, of course, that one be able to make causal inferences with certainty, based on matters of fact, about things as they are in themselves. So it is these inferences which he carefully and thoroughly defends against the attacks of Hume and Kant. The resulting critiques of the Humean and Kantian philosophies, which run from sections 74 to 114 in the text, are brilliant Brentano at his best and make worthwhile reading for anyone interested in either Hume or Kant. The defense of Brentano's own theory of causal inference and physical certainty, in which he relies heavily on Laplace, together with the defense of the possibility of transcendent inferences and of the coherence of the concept of God, complete the preparations necessary before the actual proof can be embarked upon. This all takes Brentano nearly half of the entire course of lectures, a point worth noting lest anyone doubt that Brentano was serious about treating his question scientifically.

The second part of the course of lectures is devoted to the four proofs, the teleological proof, the proof from motion, the proof from contingency, and the so-called psychological proof. The first three are reconstructions of traditional proofs; the fourth is a new construction by Brentano. By far the most attention is devoted to the teleological proof. There Brentano distinguishes carefully between the appearance of teleology and the reality of it. As he notes, it is one thing to show that the world looks to us as though it had been designed, and quite another to prove that it must have been designed. The considerations bearing on these points take him through an extended discussion of the findings and theories of Darwin. Brentano distinguishes between the fact that species have evolved (which he accepts) and the Darwinian attempt to explain this fact by natural selection in the struggle for survival (which he rejects). Anyone with an interest in evolutionary theory and in Darwin will find Brentano's treatment worthwhile reading, especially sections 301 through 350. The proofs from motion and contingency do not require as extensive an empirical base as the teleological proof does, and so the expositions of them are shorter. However, these two proofs and the psychological proof are in some ways more difficult to follow because they require of the reader a certain amount of patience with Kastil's explanatory notes, which are intended to clear up some technical points in Brentano's later philosophy.

Likewise the concluding essay, "The Train of Thought in the Proof of God's Existence," is rather compact and relies heavily on the theories developed by Brentano during the latter part of his life. Despite these drawbacks, the essay is an adequate and concise summary of the lectures, even though Brentano had changed his mind somewhat about how the proofs should best be constructed and related to one another.

Because Brentano's proof procedure is empirically based, he relies heavily on science and mathematics. Of course, the developments in science since Brentano's time, and even since the time Kastil edited this work, have been so abundant and varied that by now it would be an awesome task to bring Brentano's lectures into line with them. Kastil attempted to do some of this before 1929. Rather than do the same for Kastil's notes, I have simply let Brentano's use of science and mathematics stand as it is. Many of his comments--on gravity, the curvature of space, the hemispheres of the brain, the ether, some finer points of genetics, probability theory, and the orders of infinity--may strike the reader of the 1980's as being naive. Since the same will happen someday to many of our ideas, however, it seems more important to note that many of Brentano's important philosophical points remain applicable. Moreover, it is safe to say of Brentano, as it is of Aristotle who was his philosophical mentor from across the centuries,[2] that new discoveries in science would only have delighted him and challenged him to make the required changes in his philosophical theories. No one dedicated to the empirical approach could feel otherwise. At the same time, certain philosophical principles must remain unaffected by science. The reader is encouraged to pursue Brentano's proofs in the light of recent

[2] Brentano was an avid student of Aristotle. His doctoral dissertation is, *On the Several Senses of Being in Aristotle*, Tr. Rolf George (Berkeley: University of California Press, 1975). See also, *The Psychology of Aristotle*, Tr. Rolf George (Berkeley: University of California Press, 1977), and *Aristotle and His World View*, Tr. Rolf George and R. M. Chisholm (Berkeley: University of California Press, 1978).

science and see where they lead. On some points, for example in the discussion of natural selection, he may have been ahead of his time. Also, there are interesting connections to be made between Brentano's work in other areas (such as psychology, metaphysics, the theory of judgment, and the history of philosophy) and what was in many ways his favorite subject.

Brentano spent nine years of his life as a Roman Catholic priest, from 1864 to 1873. According to Stumpf, he had lost the faith in 1870 but not primarily on account of the event which that date brings most immediately to mind: the declaration of papal infallibility. Rather, it was Brentano's conviction that he had found certain insoluble contradictions in basic teachings of the Church on the nature of the Trinity and on the concept of faith.[3] As dedicated as he had been to the priesthood (a measure of which dedication is the fact that he persuaded more than one other young man to join him in it), he became after this crisis in 1870 even more dedicated than that to philosophy (and then succeeded in persuading at least one friend to abandon the priesthood). At first he continued to live as a priest, saying mass when necessary and reading his breviary as required (in fact, all his life he preserved some aspects of the sacerdotal discipline acquired in his youth); then on Good Friday in the year 1873 he went alone before his bishop and formally left the Church. What had thus begun in a quiet, private dedication to philosophy as a science eventually became a public vocation and commitment which lasted for the rest of his life. On this point, Brentano's attitude is best summed up in his own words, taken from the letter to an agnostic friend which serves as the author's introduction to the lectures: "What is religion but a substitute for a philosophy which traces the world back to its ultimate, divine cause and makes clear the purposes of its order?"

That this philosophy which traces the world back to its ultimate, divine cause should be rigorously scientific was of utmost importance to Brentano. One might even go so far as to say that the one and only fault he could not abide in Catholicism (and in Christianity generally, though he considered it the best of religions) was that it was not rigorously scientific in his sense of science; some of its propositions did not yield to his analytic scrutiny. And yet something of the spirit developed in his youth and in his years as a priest was needed in order to pursue that rigorously scientific philosophy right back to the ultimate, divine cause. As Kastil so touchingly puts this in one of his notes to the text:

> For this wise man, thinking about God was "life" in the highest sense of it up to his last breath, and we who have acquired from him the light of the knowledge of God may trust that it remains his life in that place where he has gone before us.

[3] See Brentano's *Religion und Philosophie* (Bern: Franke Verlag, 1954).

These lectures provide fine examples of Brentano's elegant style, and give one a good idea, from all reports, of the manner of his lecturing. In translating them, I have tried to remain mindful of the fact that they would have been delivered orally, and have thus incorporated some of what this implies for contemporary American English. By and large, I have avoided commenting in footnotes, as translators are wont to do, about how this or that word or phrase cannot be rendered in English. Naturally, there are occasional difficulties and discrepancies; but in the end one must have faith in one's work as Brentano had in his. Such notes as I have made appear at the bottom of the relevant page. Those notes not designated as mine are Brentano's own. The editorial notes by Alfred Kastil are appended at the very end of the book, before the index. They have been edited, but his introduction to the German edition is included in its entirety.

* * *

I am grateful to Professor Roderick M. Chisholm of Brown University for introducing me to the study of Brentano's philosophy, for asking me to do this translation, and for his assistance as general editor of Brentano's works in English. I wish also to thank the Franz Brentano Foundation for their financial support of my work on this translation; Mrs. Susan Moro for her expert assistance in preparing the manuscript for publication; and the College of St. Thomas, whose Faculty Development Program and Word Processing Center aided this project. This translation is dedicated to my mother and father, who have shared with me their enthusiasm for languages.

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The College of St. Thomas
St. Paul, Minnesota

FOREWORD

Taken from a letter of Franz Brentano to an agnostic, concerning the certainty and the significance of the theistic world-outlook. (1909)

Thank you for your fine letter, which can only make the most agreeable impression on me with its simple, modest candor. Also, it lets me know what disturbs you about accepting the loftiest doctrines which have been passed down to us from antiquity, and which have been upheld with confidence by an Anaxagoras and Aristotle, as well as a Locke and Leibniz, a Liebig, a Pasteur, a Maxwell and Lord Kelvin and Helmholtz. Concerning Lord Kelvin, by the way, I just recently read an explanation by him which leaves nothing to be desired in the way of clarity on this point. At a conference of natural scientists one of the speakers had closed by saying that it can be seen from what Kelvin has argued, that natural science leaves the question of whether there is a God or not entirely open. On the contrary, Thomson* objects here, saying that this is entirely false, and that natural science rather has an unqualified and pervasive need to presuppose a divine first principle. Elsewhere he tells of being a young scientist when Liebig visited England and of accompanying him on a walk through a flowering field. Thomson asked him whether he really believed that one such blossom could be conceived to exist without an intelligent cause; whereupon Liebig answered, "No, surely no more than I believe that without an intelligent cause there could be a book describing the whole amazing structure of such a blossom." You see, it was precisely the teleological proof which presented itself with all its persuasive power on this occasion, just as it did when Aristotle said that those who look at the world and are not convinced of an all-governing intelligence are like people devoid of any powers of reflection.

But of course, your letter shows that when you doubt the existence of such an intelligence you don't do so without reflection. So maybe only the observation of Bacon of Verulam**. is applicable to you, when he says that half of knowledge leads one away from God, but the whole of it leads one back to him again. Perhaps you'll remark here that Bacon may be right in this, but the only judge of it would be one who possesses all knowledge himself. You don't have it, though, and neither does any other mortal; and therefore in our position it is logically required, if not that one be an atheist, at least that one refrain, like an agnostic, from making any judgment as to whether there is a God or not.

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* i.e., William Thomson (1824-1907) who became Lord Kelvin. [Tr.]

** i.e., Francis Bacon. [Tr.]

Still, there can be no doubt that if you said this you'd be misinterpreting the intent of the Baconian saying. By the whole of knowledge he certainly did not mean an absolute omniscience. Rather he was speaking of a totality of the kinds of cognition which are given to us humans, of a faculty of consideration which would not stop short at the objection that currently presents itself but which goes on to seek out the means of answering it and arriving at certainty. None was more convinced than Bacon that the era of fruitful scientific investigation is really just now beginning. Likewise Newton, after he had accomplished great things, compared himself to a boy who had taken a couple of mussels out of the ocean while the ocean still hid countless others in its depths. Leibniz also said that following the introduction of his *characteristica universalis* mankind would make more scientific progress within decades than had been made until then in centuries and millennia. Thus he made it clear how far he was from believing that human knowledge had already achieved its completion. In the same way, too, Maxwell and Pasteur, Lord Kelvin and Helmholtz were hardly operating under the illusion that our knowledge is complete. They would have to have been extremely poor thinkers to have clung fast to the conviction that a God exists, if the simple fact that we remain ignorant of much in the world could have the logical consequence that we must remain uncertain about the question of God's existence.

And yet that is exactly the idea which forms the basis of your whole objection, both in general and with regard to the teleological proof. That is, what else does it boil down to when you appeal to the limitations of our vision and other perceptual abilities? And when you appeal to the results of recent investigations which show that many formulations of laws, which until now have been held to be precise, are actually imprecise, and that therefore these laws are no longer strictly-speaking laws, but rather compilations of facts? And when you say that in our present position such compilations of facts appear to be approximately accurate, and that for a short time to come a similar accuracy is to be expected with greater probability for yet other facts?

As for the first of these points, at no time have the limitations of our perceptual abilities gone unnoticed. As for the second, what sometimes happens to our formulations of laws can mean absolute ruin for the theistic hypothesis only if it should be the case, not only that the statement of this or that law is imprecise, but that all the laws which mankind believes are known turn out to be illusions. In fact many do go this far, and will concede even to mathematical theorems no higher value than that of general inductive facts which are not perfectly precise. You mustn't go so far in your infatuation with pragmaticism, and anyway, you surely will not doubt that there are strict laws of thought. But if there are, then no matter how much remains obscure it will still be possible to gather enough from experience in order to construct a proof of God's existence. In particular, one could construct a teleological proof of such infinite probability that it may be regarded as the equivalent of a rigorous, mathematical deduction. Where a doubt arises as to whether things do have a particular nature one can proceed dilemmatically. Thus, for example, if atomism (which has at times appeared entirely certain to natural scientists) were to be cast in doubt again, then whether one assumes that it is true or that it is not true, in either case there will appear distinct points of departure for a teleological proof. Or if some say, like the dualists, that the world consists in bodies and unextended spirits, while others say it is all bodies, or nothing but spiritual, unextended individuals, in any case one can find a definite basis upon which to rest the proof. Or again, among those of the materialistic-monistic persuasion there may be some who derive everything from primeval matter which has no mental activity, while others derive it all from something which possesses the seeds of the most elevated thought in some kind of primitive sensation. But however it is conceived it still offers a foundation for a teleological structure. And I could go on in this way, mentioning the differences between those who see the world as entirely mechanical and those who find it to be activated by all kinds of energies, as well as the differences between those who believe in a qualitatively uniform primeval matter and those who see a plurality with elementary differences working together, etc. The teleological argument does not lose its foundation.

Cuvier, who didn't believe in the development of species, and Lamarck, Ampere, the Darwinian Weismann, and K. E. von Baer and Lodge with their singleness of purpose in nature, all take very different views of biological evolution. Nevertheless they are all equally led to the assumption of a God as the ultimate explanation of teleology in organisms. And if anyone believes (as Hering once confessed to me he did) that organisms have existed on the earth without a beginning, in order to escape the difficulties of accounting for their first coming to be, then he will find himself, upon more penetrating consideration of the matter, no better able to dispense with the God who determines the order of things. One can twist and turn at will, but the teleological proof always appears equally possible and equally certain. Even solipsism fails to escape it, as Locke and Leibniz have already rightly acknowledged. For this reason they are in agreement that the existence of a God is even more certain than that of an external world, and apart from the existence of ourselves, it is the most certain knowledge there is concerning an existent thing. The empirical basis we require for the proof of God's existence is so minimal; though, of course, we need to make the most ample and vigorous use of the truths of reason. All those who have been bewildered by the proofs of God's existence, due to a doubt which arises concerning some putative result of what is now inductive investigation, have not made sufficient use of what reason allows us.

Everything I'm saying here is very generally suggestive, and would naturally gain quite a lot by more precise exposition. But I believe you know me well enough to be convinced that I don't just like to speak in lofty phrases which promise much without providing for verification and defense against an objecting critic.

It would please me very much indeed to be able to give you the opportunity to examine my position with the utmost precision. For today, however, what has been said may suffice. Let me just briefly mention, because you touch upon the law of increasing entropy, that I believe its probability is not diminished by anything that any scientist has tried to advance as being applicable to the universe. For example, when Boltzmann visited me in Florence, right away I reduced him to the greatest embarrassment over the means of avoiding the thermal death of the universe, which he'd prided himself on having discovered.* And in keeping with his noble, upright character, he did not deny it.

If you had already accepted theism as certain, you surely wouldn't find it improper, as you now do, that I call attention to this advantage of it. Countless other conclusions are connected with it. Without theism it is indeed possible to have a comprehensive, encyclopedic knowledge of the world, but not a philosophical explanation of its nature, nor a prediction of its future encompassing the most distant times and the expansion of the physical and spiritual world, such as a well-grounded optimism provides. An agnostic, as opposed to an atheist, grants that the theistic hypothesis is possible, although for him it has a finite probability. So, of course, he can draw these further conclusions of theism at least hypothetically, and thus, although their probability is finite, they open up sublime and joyful prospects. But which of you agnostics ever does this? I know of none, and surely that's because the agnostic, believing he has shown the theistic proof to be untenable, regards the arbitrary assumption that God exists as something so improbable that it no longer deserves such serious hypothetical-consideration. Therefore, though perhaps he is not exactly to be numbered among the atheists, he is incomparably closer to them than he is to the theists. And so for my part I do not at all deny that the fact that a thinker is a theist, or not a theist, appears to be of eminent significance in assessing his stature as a philosopher.

Philosophy most of all has the value of a theoretical science. That is, the knowledge of her truths, more than that of any others, is worthy to be desired quite apart from any practical considerations. But she loses this superiority altogether if the existence of God, and everything connected to this as a consequence, is banned from the domain of philosophical knowledge. If such knowledge includes these truths, then philosophy can afford us a full consolation such as the praised consolations of religion itself cannot approach. But if philosophical knowledge does not include these truths, then mankind finds it is advised to seek its comfort in poetic illusions, just as Albert Lange openly recommends.

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* Boltzmann believed that thermal equilibrium, or maximum entropy,was not inevitable because although it is highly probable that entropy always increases it to not impossible that it decreases. [Tr.]

You complain, my dear friend, of the lack of interest which audiences ... bring to philosophy. If one is honest, though, one will very well understand such lack of interest. You yourself quite rightly note that the tasks which experimental psychology sets for itself are not of great appeal, and you praise Kulpe for raising questions beyond the scope of his investigations. But I'd venture to say that even these, if they serve no practical purpose and are purely for the sake of elegant results, are not sufficiently attractive to an ordinary human disposition. On the other hand, the investigation which reveals to us a divine cause of the world and thus optimistically illuminates the fate of the world and our own fate, provides in the sublime consciousness of these very truths that which is most enchanting of all the world has to offer.

Mankind has a universal, natural longing for answers to these questions, and the fact that religion is as universal a phenomenon in the history of peoples as the formation of government is bears eloquent witness to this. For what is religion but a substitute for a philosophy which traces the world back to its ultimate divine cause and makes clear the purposes of its order?

INTRODUCTION

THE THEORETICAL AND PRACTICAL INTEREST OF THE QUESTION OF GOD'S EXISTENCE

1. Anyone who begins a series of lectures does well to say a word about the importance of the subject matter,[1] in order to arouse interest in the inquiry. Sometimes this might be needed, too, but certainly not in this case. If it is actually possible to acquire a rational belief in the existence of God, then there is no doubt that the inquiries which aim at this are of the highest theoretical interest and also have great practical significance.

Nevertheless, we want to dwell upon these points briefly, in order to be even more actively aware of them, and thus to be able to face with persistent patience the difficult considerations to come.

2. First a word about the special theoretical interest of the question of God's existence. Each act of knowing is good in itself, but all are not equally so. Any act of knowing is valued according to the worth of its object, according to the extent of the area upon which it sheds light, and indeed also according to how memorable it is. In view of the first of these considerations, botany is given the graceful name of *scientia amabilis* [the lovely science]. And in view of the second, those sciences are more prized which not only explain what exists and what happens, but also lead to the causes and indicate the universal laws to which the development of a single thing is subject. The law of gravitation is more interesting theoretically than is today's date or any other detail of history or of natural description.

By whichever standard we wish to measure it, the knowledge of God appears to be the most valuable, theoretically speaking.

a) According to the concept of God, he is a being of infinite perfection. What could be dearer to one who loves what is good than the information that the ideal of all ideals is real? Thus Plato and Aristotle, who considered the examined life and the life of contemplation to be the happiest, also found that this knowledge is the greatest blessing allotted to mankind. And they were not dissuaded from this conviction by the fact that the idea which we have of God is only a poor substitute for the perception of God which is denied us. By means of a fortunate comparison, Aristotle was able to make it clear that in spite of this the idea of God can be of surpassing value. It would be, he notes, a greater joy for us to catch a glimpse of someone we love, even if only from a distance and in dim light, than to behold clearly and at close range an object to which we are indifferent.

b) But along with this knowledge of God we possess a truth which is in a certain sense better ensured than all other positive truths.[2] For it presses beyond all mere matters of fact to that which has no need of further explanation, since it is necessary in itself. By a mere matter of fact I mean what may depend upon conditions which are changeable and which are also such that if they cease to be then it ceases to be, too. But that which is necessary in itself is the very reason for all other things. And if it should further turn out that this reason is the reason for all that is, then it is apparent that the knowledge of it also far exceeds all others in unforgetable certainty. The knowledge of the universal principle sheds its light upon all things, upon what is, what was, and what will be. The great cosmological questions--whether the world is a unity or a plurality, whether it will ultimately end or continue forever, whether its course is more toward good or evil--they are all to be resolved only in the light of the question of God's existence.

3. With the far-reaching influence of the truth which our inquiries are supposed to assure, there coincides its great *practical* significance.

a) Apart from the theoretical joy of an explanation of the great, eternal, universal question, there is to be found here a rich source of happiness. For if there is a God, then a wise, loving, Lord and Father lives for us. And his existence is, in my opinion, and from the point of view of all, or at least of all good men, of great benefit to everyone; and in the consciousness of its possession we feel more enriched than by any other good. Therefore Leibniz says, quite to the point (*Remarques sur un petit livre*): "It is maintained that the thought there is no God never yet made anyone tremble, but that the thought there is one has indeed done so. I am not of this opinion. One can tremble not only when one fears a great evil, but also when one thinks of losing a great good."

b) Leibniz also points out what others have often stressed, namely, that the belief in God's existence would be a consolation in misfortune. But Goethe finds that good men are even more in need of this when they are happy.

c) It becomes especially clear how much the question of God's existence means for the happiness of a noble human heart, when one thinks of the connection between this question and that of individual immortality. Everyone alive has a natural longing to persist as a person. And the voices of the great poets, who know the heart of man best, testify to this. Goethe's

And as long as you're not sure
Death's another birth,
Only grimly you'll endure
Guest of this dark Earth*

is well-known to all of you. And, although I am perhaps less confident of its familiarity, I would especially like to call your attention to a beautiful poem by Gottfried Keller, because it gives expression to the deeper motives for this longing:

'Tis neither selfishness nor vanity
That draws my longing heart beyond the grave;
What lets me bridge that gulf and makes me brave
Is pride alone which dust from dust can free.

The greening time on Earth will quickly flee --
But endless all the Sprit knows to crave!
What little happiness is here to save
And cherish in your breast -- small ecstasy!

And yet when once its freedom is achieved,
Then mankind glows, e'en as a rose is wont
As through each petal sunlight is received:

The longing stays which carries us beyond,
The nightingale still sings, her song's perceived
By every new unfolding bud and frond!**

---

* Und solang du dies nicht hast,
Dieses stirb und werde,
Bist du nur ein trüber Gast
Auf der dunklen Erde

** Es ist nicht selbstsucht und nicht Eitelkeit,
Was sehnend mir das Herz grabüber trägt;
Was mir die kühngeschwunge Brücke schlägt,
Ist wohl der Stolz, der mich vom Staub befreit.

Sie ist so eng, die grüne Erdenzeit,
Unendlich aber, was den Geist bewegt!
Wie wenig ist's, was ihr im ßusen hegt,
Die ihr so satt hier, so vergnuglich seid!

We feel ourselves called to more and to higher things than what this earthly life can disclose or achieve; hence the need to persist as a person, and hence also the hope, from the very beginning, that one will do so. But it is difficult to demonstrate that this hope is not in vain; and indeed the most significant arguments which support it would collapse if there were no God.

The explanation of this is too much to go into here. However, there is another motive for our inquiry, also to be shown very briefly, namely, that the thought of immortality is rather more disturbing without the belief in God than with it. For in that case we would completely lack all possibility of preparing for the hour of death, since it is the idea of God which teaches us that already in this life we can make provision for good in the next and be secured from perdition. This is especially so if God is to be thought of as retributive justice, since then, just as the laws of nature are, so the law of just retribution would become the basis of a significant extension of power.

d) And if we turn from the high thoughts of our own eternal life to even higher ones of the future of the entire sphere in which we operate, the situation is similar. Will there really be a future? Will it be happy or unhappy? The spirit which is indifferent to all this must be incapable of any noble feeling.

So this is one point of view from which the great practical significance of the knowledge of God is evident.

4. Another view arises from the relation between the belief in the existence of God and morals.

a) Kant claims that faith in God is a postulate of practical reason. Schiller, influenced by him, made the worth of a man dependent upon trust in the "three words of faith": freedom, virtue, and God.

b) To be sure, full clarity does not reign over the nature of this connection between theism and morals. Many are of the opinion that knowledge of what is good or better and bad or worse cannot be gained without prior knowledge of God. Apparently it occurs to many that the recognition of good and evil is the knowledge of commandments, and in

Und wenn auch einst die Freiheit ist errungen,
Die Menschheit hoch wie eine Rose glüht,
Ihr tiefster Kelch vom Sonnenlicht durchdrungen:

Das Sehnen bleibt, das uns hinüberzieht,
Das Nachtigallenlied ist nicht verklungen,
Bei dessen Ton die Knospen sind erblüht!

fact of commandments which are made known to us by means of supernatural revelation. But it is easy to show that a theological ethic of this kind would be circular. In order with a clear conscience to accept as *genuine* revelation an ethic which purports to be revealed by God, I must have criteria of its authenticity. Now the credibility of a report depends not only upon external evidence and upon our informed opinion about the reliability of witnesses, but also upon the intrinsic probability itself of what is reported. This is too little borne in mind by the so-called Apologists. Thus, for example, De Maistre, the famous French advocate of the Catholic faith, considered the report of a miracle--such as the raising of the dead, or the resurrection of the crucified--to be just as believable as the life and exploits of Julius Caesar, provided only that the one be as well-documented as the other. This shows insufficient respect for the law of probability. For this law requires us to accept the report of an event more as it is the product of two factors: the reliability of the witnesses, and the intrinsic credibility of the report itself. Instead of offering a theoretical explication of this, which would belong to the study of logic, here is just an example by way of illustration. If our proctor sent me word that a foreign colleague, who was visiting here, would wait for me after the lecture at the door of the auditorium, it would not occur to me to doubt this. But if the same man announced to me the arrival of a dead colleague, I would not readily believe him, no matter how well I knew him to be honorable and serious. But I would search out other hypotheses suited to explain the occurrence of such a strange report. And what holds for events holds also for traditional doctrines. If Smith, the leader of the Mormons, demands that we accept his doctrine of many wives as an addendum to Christianity revealed to him by God, we resist such a demand. Not so, if Jesus preaches to us the love of neighbors and enemies as a commandment of God. Surely he is not wrong who says that God only commands what is good; but a thing is not good because God commands it, rather God commands it because it is good. These concepts might have the same scope, but they are not identical. And from this it follows that a rational judgment of allegedly revealed morals already presupposes a certain standard of awareness of natural morality. For an allegedly revealed moral law must first be tested for whether it would be worthy of God, that is, for whether it would in no way contradict the natural moral law.

Actually, it is possible, without reference to the question of God's existence, to know what is good (worth to be loved) and bad (worthy to be hated), and likewise what is better (i.e., what merits superiority over another thing). For example, we immediately recognize as naturally correct our love of knowledge and of joy, our dislike of error and of suffering, and the superiority of greater to lesser goods or of lesser to greater evils. And thus, without reflecting on the first cause, we arrive at a system of ranking goods, and at the insight that our highest practical good consists in each case in the largest achievable sum of those goods along with a minimum of those evils. Although the principles of ethical knowledge thus seem to me to be independent of metaphysics, still I must call attention to one point, where ethics faces the question of the existence of God, and from which it proceeds in one direction or another according to the answer. To be sure, a moral system is independent of this. But in our moral decisions we have to ask not only what is to be regarded as good or evil in isolation, but also wherein consists the very best we can achieve under the given circumstances. Also, the best we can achieve could be the mere means to what is good (something useful), which under other circumstances could be downright evil, so that the choice of it is justified only because every other decision would bring on something even worse. We formulate this practical problem most generally when we ask ourselves whether this physical life may be considered more useful than detrimental to our highest practical good. Who would fail to recognize that this is a fundamental ethical question, and that it cannot be answered in the absence of some connection to the question of the existence of God? For how else shall we come to any probable expectation concerning whether the continuation and propagation of life will result more in good or in evil? But whether we can with good reason believe in an ethic of life and action, or in one of resignation and nirvana, depends upon this expectation. Certainly, on the basis of the small part of the past which is called human history, the decision between these is not to be made with a relaxed optimism. Anyone, like Schopenhauer, who is of this narrowly historical frame of mind, is much more inclined to pessimism and to the denial of life. In antiquity, suicide was epidemic for a while among philosophers, that is, among those whose work it was to ponder the value of life. And our time, which is conscious of a much more advanced culture, also has its poets and prophets of doom, who are met with great approval. If one replies that suicide is still much less frequent than would be expected, this only shows the strength, but not the rationality, of the will to live.

There are those who see, in the past and in the present, more error and unreasonable narrow-mindedness than vision, more baseness and deplorable weakness than virtue and respect for moral law, more agony and suffering than joy and contentment. And even if we assume that these look only on the dark side, still the question of how we ought to manage our lives depends, as has been said, upon the hope for the future. This holds for the individual, and it holds for the community. Anyone who knows he is terminally ill and must reckon with the fact the end is near, knows thereby that his obligations have changed. And a race which is firmly convinced that the end of the world is imminent, cannot recognize an ethic of action and earthly progress as appropriate to its situation. But a final end beckons to the entire race of mankind. Helmholtz[3] once remarked that perhaps one could devote oneself to concern for future generations without the belief in personal immortality, but never with the belief in the inevitable demise of the race of mankind. Anyone who wants to give his life to serving what is good needs an answer to the earnest question--"Is this all there is?" But it is possible to give an answer only in connection with the thought of God. This thought alone assures us of a purposeful ordering of the world; it alone guarantees that everything proceeds rationally from an original cause and aspires to a rational goal; it alone gives us the rational hope of a personal persistence of the soul, which will outlast the destruction of the temporal world; and thereby it subjects this life to a law of responsibility which has its roots in eternity. An optimism without God is not an optimism of the reason but of the blind will to live, and thus abundantly deserves the disdain of a Schopenhauer; which disdain is far superior in terms of consistency to the thoughts of our modern atheists with their naive faith in the ideal of progress. These atheists are ruled by blind instinct every bit as much as are those who high-mindedly repudiate "everything transcendental" and thus believe in things just because they can touch them.

These remarks will suffice to make understandable our opinion that no practical ethic can be constructed without a metaphysically established hope for the future. So in this sense it must be granted that the question of the existence of God has a decisive significance for morals.[4]

5. But if the question of God's existence is significant for morals, then it is so for politics as well, since this has its foundation in ethics. The social order requires a moral sanction. They can maintain it only temporarily with machine guns. Which is why Voltaire said, if there were no God He would have to be invented. The progress of the French Revolution resulted in the state's proclamation of the belief in God as dogma. And it was certainly with a view to such connections between morals and the belief in God that John Locke, the apostle of religious tolerance, excepted the atheists from it. This restriction is neither justified nor wise, but the prominent threat of atheism to the social order makes it understandable.

6. Just as our personal happiness, and moral conduct, and social order are all beneficially influenced by the belief in God, so too is the domain of art. This has been stressed repeatedly. The inspiration of a people reaches its heights in architecture, painting, sculpture, and poetry--and most sublimely in tragedy. The tragic poet wants to give us a likeness of life, not with historical accuracy but, as Aristotle says, "in a philosophical way." In the image of the particular, the poet indicates what is eternal, the power and the law which hold sway over all that is. And so it is not altogether a matter of indifference whether the poet himself is capable of seeing the highest things clearly and correctly. Thus the quality of the drama varies for better or for worse with the poet's view of the world; and if theism is true, then the tragedy with theistic inspiration is intrinsically

admirable. But we glance only briefly at these points, since those mentioned earlier are certainly of broader significance. However, the facts about art are suited to show that the belief in the existence of God permeates every area of the higher life.

7. That the question of God's existence surpasses all others in importance is something even the atheists admit, in their own way, by the trouble they take to deny every attempted proof and thus to free themselves from an idea which would otherwise have the right to govern their entire lives. If they encounter a hypothesis which promises to make superfluous the assumption of a divine creator of the world, they take hold of it at once with a great zeal. As the example of Darwinism's teleological view of the world shows, their enthusiasm is less for the natural-scientific merit of the hypothesis than for its philosophical value.

8. My opinion is opposed to such an endeavor. I believe that, weighed correctly, the facts are to the highest degree favorable to the assumption that there is a God. But I am far from wanting to impose this opinion on anyone with the force of authority. Everyone may think freely and follow the inquiry as critically as is possible. I do not wish to give you a blind faith--which would have little prospect of lasting long--but rather insight and knowledge, as a sure foundation for your entire view of life. I will also develop the arguments against God's existence just as carefully as those which are for it. And many an argument will be sure to look impressive at first. But I hope that in the end you will be all the more persuaded to agree with the fine words of Bacon to the effect that a casual study of philosophy leads us away from God, but to delve more deeply into it is to be led back to Him again.

PART ONE

PRELIMINARY INQUIRIES

FIRST PRELIMINARY INQUIRY:

IS THE INQUIRY SUPERFLOUS? THE CONTENTION THAT THE EXISTENCE OF GOD IS ESTABLISHED A PRIORI

I. SUPERFICIAL ARGUMENTS FOR THIS

9. Before we begin, we must not neglect to examine two views which are opposed to our task. These views are opposed to one another as well, but they are agreed in that they would save us the trouble of proving the existence of God, the one because such a proof is superfluous, the other because it is impossible.

Our attempt at a proof would be superfluous if the existence of God were self-evident for us, that is if, as soon as we said "God exists" and were conscious of what we said, the proposition were evident to us *a priori*. And our attempt at a proof would be impossible if it followed from the nature of God, from the meaning of the name "God," that his existence does not admit of proof. The first is a remarkable contention; nonetheless it is made repeatedly and advocated by distinguished thinkers and with diverse arguments.

10. The ease with which children accept the belief in God has been appealed to, as has the agreement of all peoples in believing in him.

It is held that both would be inexplicable if the knowledge of God were not immediate, be it innate or immediate in the sense in which axioms are.

Reply: a) What do children not believe easily? One could infer from this that every fairy tale was innate.

b) At the beginning of life we human beings actually harbor a boundless trust in all areas. We trust experience, in that we readily expect similar things under similar circumstances; we trust the senses, in that without hesitation we take for real everything they present to us; we even assent to our fantasies as though in a waking dream. Disillusionment first makes us more critical.

Also we at first believe everything told to us by other people, especially by those who have given us proofs of love and of superior insight. A young boy starts out believing his father knows everything. We do not even consider the possibility of errors or of deliberate deceptions until disillusionments begin to weaken our trust even in our parents. But once criticism and suspicion are awakened they may also be turned toward the belief in God. And so not uncommonly we encounter premature doubts in thoughtful children.

Insofar as the argument is based on the easy belief of children, then, it is invalid.

c) And the agreement of the peoples? Even Locke noticed that this agreement does not exist in the way one would expect it to do if it were inborn or immediately obvious knowledge. If one people worships the crocodile as a divine being, and another worships a Moloch or an Astarte, what does that have to do with the true belief in God? If this belief is innate, must it not rather prevent the rise of such unworthy images of God? What constitutes the content of a primitive belief of this kind? It is nothing else than the thought of a living being which is somehow--by no means in all ways--superior to us. It has rightly been said that if a dog could think then a human being would appear to him to be such a "God."

d) But even assuming that the peoples of the world really did agree in the genuine belief in God, this still would in no way be a proof that such a belief was immediately obvious. In short, just that there are plenty of obvious causes for the belief in God does not show the belief is evident to us *a priori.* (Indeed, such reasons are given for common errors, such as that the earth is stationary and the sun moves.) Obvious causes undoubtedly exist above all for those more primitive ways of thinking. A naive human being interprets the appearances of nature vitalistically, in analogy to his inner experience. A child is annoyed with a table corner he has bumped into. And it sounds childlike when Thales of Miletus, the father of philosophy, proclaims that the magnet has a soul because it attracts iron. Finally, for primitive man, every deployment of power which transcends the human is under the control of a mighty, personal being.

11. A second argument: That through which something else is certain and obvious to us must itself be more certain and obvious. (One has only to think of the axioms of mathematics.) Now God is that through which we know all that we know. He is the light by means of which all truth, including that which we know *a priori,* is evident to us. So he must be known to us above all, that is, his existence, at any rate, must be evident to us *a priori.*

This argument is still proposed today by the so-called ontologists. But it is thoroughly misconceived. It is a paralogism; and yet this is perhaps its best characteristic. For if the inference were valid then certainly the majority--and I confess I count myself among them--would conclude from it that God does not exist.

That is to say, the argument presupposes that God's existence is certain, and infers that his existence must be a truth which is immediately obvious to all.

God is that through which we know all things.
So he must be directly evident to us.
For that through which we know all things must be directly evident to us.
But the argument could be reversed:
Whether there is a God or not may be questionable at first.
But one thing is certain: his existence is not directly evident to me.
But it would have to be.
Therefore there is no God.

We see that the argument is a two-edged sword, if it is really sharp enough to cut the mustard. But it is the opposite, a paralogism due to equivocation.

12. Our reply is to indicate the multiple sense of "through which."

God is that *through which* we know all other things, but not in the sense that nothing else would be known if he were not known, as is the case with principles which are self-evident. Rather he is that through which we know all other things in the sense that all knowledge we have is produced in us by means of his direct or indirect influence. Just as he is the ultimate ground of all perfection, so also is he the ultimate ground of all knowledge. But it is one thing to know something which is the work of God, and quite another to know it as the work of God. Thus, much is in fact known by us without any connection with the knowledge of its first cause, or even with the knowledge of its secondary causes. But also, one need not see the optic nerve, the retina, the lens of the eye and that of which these are composed, nor the things which produce light and color; in fact, these can be actually unknown, and still they are that through which something is known. And so this argument turns out to be inadequate; indeed its error is greater than that of the previously mentioned arguments.

13. These are not the only attempts at characterizing the existence of God as a truth which is given to us *a priori*. But most of the others are hardly worth mentioning, and are easy to refute without any special philosophical training. There is only one of which this cannot be said, since it is quite a bit more interesting than the others are. It is an attempt which aims to show nothing less than that the existence of God follows directly from the concept which we unite with the word God.

II. THE ONTOLOGICAL ARGUMENT FOR THE EXISTENCE OF GOD

A. ITS HISTORY FROM ANSELM TO LEIBNIZ

14. Even the history of the ontological argument is remarkable. It was devised eight hundred years ago by the sharp-witted Anselm of Canterbury, and to this day it finds supporters and opponents. The most famous thinkers have concerned themselves with it. One Alexander Alensis was in favor of it; Aquinas, Scotus, and Ockham were able to raise many an objection to it. But one Raymund of Saybunde took it up again, and the dispute has been carried on from the middle ages into the philosophy of modern times. No less a man than Descartes renewed it in a version unique to him; Spinoza made it the foundation of his geometric system in the Ethics; and even Leibniz approved of it in a certain sense, because he was only concerned to fill a gap he had found in it. But Hume and Kant declared themselves decidedly against the argument. And their remarks set a precedent, but still were not able to prevent there being those among later philosophers who came to a more favorable opinion, so that today the argument still has supporters as well.

15. I want first to lay out the argument as it is in Anselm, then as it is to be found in Descartes; then I want to let Hume and Kant have their say against it, and finally to give my own judgment of it.

In Anselm the argument is to be found in the following formulation:

a) When we think of God, we think of a good than which no more perfect can be conceived. From this we can see straight away that that which we call God exists.

b) Above all it is clear that what we call God exists in our understanding (as often as we think it).

c) But it is impossible that that than which nothing more perfect can be conceived should exist *only* in the understanding. For what exists in the understanding *and* in reality is more perfect than what exists only in the understanding.

d) Accordingly, if God were to exist only in the understanding, then something more perfect than God could be conceived.

e) Now by the name "God" we designate that than which nothing more perfect can be conceived. So if God were to exist only in the understanding, then something would be conceivable which is more perfect than that than which nothing more perfect can be conceived, which is a contradiction.

f) Therefore God exists not only in the understanding but also in reality.

16. An objection against this was raised by Anselm's contemporary, the monk Gaunilo, in an anonymous work which he entitled, as a play upon a passage in the Psalms, *Liber pro insipiente [In Behalf of the Fool]*. His objection was that existence in reality must be established first, if the argument is to be valid: "First I must be certain that that more perfect being exists somewhere in reality, and only then will it follow without a doubt from the fact it is more perfect than any other that it also exists in reality." A comparison should shed light on Anselm's mistake: Legend has it that there is an island somewhere in the ocean--it is not to be found--which is so rich in natural resources and so fruitful that no island can be found which equals it. According to Anselm's method we would have to conclude that the island really exists. For a merely imaginary one would not be better than all known islands.

In his reply--*Liber apologeticus contra Gaunilonem respondentem* [*Anselm's Apologetic*]--Anselm rejected the comparison as being inapplicable. His opponent had failed to consider that a distinction is to be made between what is absolutely the most perfect and what is the most perfect within a given class.

17. Many must have taken Anselm's side in this, because Thomas Aquinas refers repeatedly to such adherents in his *Summa contra gentiles*. He himself did not follow suit, but rejected the argument in a manner essentially like that of Gaunilo: If God means that than which nothing more perfect can be conceived, then anyone who concedes that that than which nothing more perfect can be conceived exists in reality must immediately concede that God exists in reality. But the atheist concedes not this but only that that than which nothing more perfect can be conceived exists in the understanding. And from what we indicate by the name God it also would appear that it follows it exists in the understanding, and nothing beyond this.

18. Then came Descartes, and with him the renewal of philosophy, and behold the ontological argument also reappeared, albeit in new raiment. He reasoned as follows:

We have the idea of an infinitely perfect being, that is, of a being which includes all conceivable perfections. Now since existence belongs among the perfections, this idea includes not only the possibility of its object as other ideas do, but it contains the real, even necessary and eternal existence of its object.

But what is included in the idea of a thing can with certainty be affirmed of it.

So I can say with certainty that the infinitely perfect being, i.e., God, exists. (With just as much certainty as I can affirm of a triangle that the sum of its angles taken together is 180 degrees because the sum of two right angles is contained in its concept.)

Descartes expressly wishes to make clear that his argument is different from Anselm's. Anselm would conclude:

God means that than which nothing more perfect can be conceived and must therefore be imagined the most perfect of all conceivable things. Now it is greater to be real *and* to be in the imagination than to be *only* in the imagination. Therefore God is not only in the imagination but is also real.

That would be a blatant paralogism, for to infer in this manner would be no more than to say, God must be *imagined to be* not only something in the imagination but also something existing in reality.

Descartes himself concludes quite differently:

That which we know clearly and distinctly to belong to the nature of a thing we can with certainty affirm of the thing. Now we know clearly and distinctly that existence belongs to the nature of the most perfect being.

Therefore we can affirm this of it with certainty. That is, we may affirm, God exists.

You will notice that what Descartes advances against Anselm is essentially the same as Aquinas' objection. Descartes believed the weapon to be devastating for Anselm; but he was not afraid that it could be turned against his own argument.

19. But a different objection was made against Descartes himself, to which he did not wish to deny all justification. The author of the *Objectiones Secundae* (so called because it was printed as the second appendix to the first edition of Descartes' *Meditations*) pointed out a gap in the argument (perhaps Suarez prompted him to see it). The proposition, "What is clearly and distinctly included in the concept of a thing can be affirmed of it," is not valid all by itself, but only on the presupposition that the nature of the thing is possible. Otherwise one could affirm of a round triangle that it is a triangle.

20. Descartes consented to this limitation, but did not consider it dangerous to his argument. For that the nature of God is possible is evident to us *a priori*. That is, the concept of God is among those which are clear and distinct, and such can contain no contradiction. Of course, in saying this Descartes did not mean to represent the idea of God as a model of clarity in all respects, but only in the pertinent respect that existence is included in the concept of what is infinitely perfect, for in any case this is sufficiently clear and distinct.

The Englishman Cudworth judged similarly; and also Leibniz and his followers were of the opinion that the ontological argument, as formulated by Descartes, was perfectly valid, but that it did presuppose a demonstration of the possibility of an infinitely perfect being. To be sure, Leibniz was not satisfied with the way Descartes himself had attempted this demonstration. It is by no means always permissible to carry something to its superlative. For example, the concept of the greatest velocity would contradict itself. How could we be certain that this is not also to be said of the "greatest perfection?" In any case, the concept of the "fastest motion" cannot be made clear by the fact one can think clearly of what motion means, on the one hand, and of what the greatest means, on the other. Rather, the concept would only be clear if the connection between these two were also clearly intuited. Nevertheless, Leibniz believed he had mastered the difficulty: in the concept of a perfection is included the idea that it is something positive, and not a mere negation, whatever else it may be. And so the concept of a being which includes all perfections contains no negation; and for this reason it also contains no contradiction, since this can arise only in the conjoining of an affirmation with a negation.

Therefore the concept of God is to be recognized as possible from the outset.

B. HUME'S CRITIQUE OF THE ONTOLOGICAL ARGUMENT

21. While Leibniz considered the ontological argument essentially valid, Hume and Kant number among its opponents. Today little is said about Hume's opposition to the argument, since much is made of the criticism Kant leveled against it. Kant is celebrated as the first to uncover the actual mistake made in it. But we do not want to neglect to mention Hume, who had a substantial influence on Kant in this as in so many other questions. What Hume was able to put forward is sufficiently interesting on its own account, too.

Hume's opposition to the ontological argument is not superficial.[5] He means to derive its force from the depths of general psychological considerations. Errors in the understanding of the nature of thought and of judgment have reaped in this argument just what they have sown, according to Hume.

What does the proposition, "God exists," signify?

Descartes and other ontologists are of the opinion that it affirms the general concept of the existence of God. The judgment which the proposition expresses consists in the conjoining of the concept of the predicate with the concept of the subject.

This is false, according to Hume, and also impossible because "existence" is not a general concept at all. The existence of a thing is nothing else than the thing itself; and the proposition, "a thing exists," is not the attribution of a predicate but the expression of belief in the thing itself.

And what is this *belief* in the thing itself? Here, according to Hume, we come up against the second error of the ontologists, namely that belief, or judgment, is a relation of two ideas to one another. But in truth judgment is a special manner of conception, which Hume wants to designate sometimes as a "feeling," and sometimes as "a firmer conception, a faster hold, that we take of the object." In any case, regarding the proposition, "A exists," it is not a question of expressing a relation between two concepts, but what is at issue is a simple fact which is believed.

From this it follows that the existence of a thing can never be established except by experience. For from mere concepts we acquire only the knowledge of the relations which obtain between them (as in mathematics, for example, the relations of which are analyzed out of the concepts of quantity). But the knowledge of a simple fact is never acquired from mere concepts.

This also holds necessarily, then, for the existence of God. There can be no contradiction in the denial of his existence. One who denies God's existence neither deprives him of a property which belongs to his essence, nor grants to him anything which would be contradictory to him. Actually he predicates nothing of him, but simply, skeptically rejects the idea of him.

Indeed, the thought of a being which is necessary in itself appears to Hume to be absolutely unacceptable, as a result of these considerations, if a being necessary in itself is supposed among other things to be such that the denial of its existence would involve a contradiction.

22. This critique includes some very significant elements, but it was not able to work a general and definite change on philosophers' opinion of the ontological argument. Many things contributed to the fact that most did not pay Hume's critique the attention it deserves.

First of all, many other things in Hume commanded greater attention. This revolutionary spirit made other attacks against principles of much more firmly established reputation. His skepticism was directed toward all of metaphysics, it even challenged the possibility of every natural science and of inductive inquiry in general. And in the face of this enormous collision, the stroke against the ontological argument was hardly felt.

Also there lay in such a far-reaching skepticism something which common sense resisted. Hume's critique must generally have raised the suspicion that it was altogether too drastic; and what is too drastic is apt to be imprecise. Without having a reply ready in each particular case, one was confident that it should be possible to answer him.

Another reason why Hume's critique of the ontological argument went largely unnoticed was that his argumentation was complicated. For many it was too difficult to form a definite opinion of the preliminary questions we have just now touched upon.

This was made all the more difficult because a complete and well-ordered presentation of all the relevant problems together was nowhere to be found in Hume. In order to follow his train of thought one must connect the observations of the *Treatise on Human Nature* with those of the *Enquiry Concerning Human Understanding* and the *Dialogues Concerning Natural Religion.*

23. In addition, his thoughts contained much that must have seemed most paradoxical to his contemporaries, and much that is decidedly false.

i. It must have seemed paradoxical above all that he would not consider existence to be a general concept. Still, this does not seem to be an error in itself. Anyone who thinks of a thing as something round, extended, as a colored.thing, as a thing, thinks of it under one general concept or another; but this is not so of one who thinks of it as "existing." One need not go so far as to say, with Hume, that "A" and "the existence of "A" are the same thought. Rather, in the latter case A is connected in a certain way with the idea of a justified belief; and this connection is a more complicated thought than is that of A, but to analyze it here would carry us too far afield. For us it is sufficient to establish that Hume touches upon something which is true when he says that propositions concerning existence involve a belief.[6]

ii. Of course, people did take offense at the way in which Hume wanted to define belief. Belief plainly belongs to that class of psychological operations which may properly be said to be true or false, this being the characteristic mark of a judgment, according to Aristotle. But for thousands of years, and almost without exception, judgment had been interpreted as the connection of ideas, and it scarcely occurred to anyone to make an exception to this definition for existential propositions. Hume was bound to arouse consternation with this suggestion.

iii. And what was Hume able to put in the place of the old theory of judgment? A doctrine which seems to be in harmony neither with the facts nor with itself.

First we hear that belief is a "feeling." But whether this designation is taken in a wider or in a narrower sense, the definition remains equally unacceptable. In the wider sense, one speaks of all phenomena of inclination and disinclination as "feelings," in the narrower sense only of pleasure and pain. That judgments, as such, are not to be differentiated in terms of pleasure and pain requires no demonstration. Now surely there are also other phenomena of inclination and disinclination but none that would not be either a love or a hate, in the broadest senses of these terms. But this opposition between love and hate is also foreign to the judging process as such, since judgment is rather differentiated in terms of affirmation and denial. A judgment can be the object of a feeling, but it is not itself a feeling.

And what of the other, more detailed definition which Hume gives of belief, namely that it is "a firmer conception, a faster hold that we take of the object"? I confess I am unable to make anything of this. Of course, I know very well that one speaks of the firmness of a belief, and of a firm conviction as distinct from doubt and from vacillating opinion. But the conception of a thing in which I believe need not have a firmer hold on my consciousness than does one in which I do not believe. And what is denial supposed to be, if belief is a special firmness of a conception? The opposite, obviously; but I could hardly indicate any such opposite other than the vacillation of the conception which, however, would be to produce a comparison with doubt rather than with rejection.

Thus Hume's definitions of the nature of belief are in no way satisfactory, and apart from that they are not even mutually harmonious. For a "feeling" is surely not the same as "a fast hold, which a conception acquires."

At this point the foundation of Hume's doctrine is decidedly faulty.

iv. Also, there is another error of Hume's which we cannot pass over in silence. He rejects *a priori* the concept of a being which is necessary in itself, and in this he definitely goes too far.

His is a shocking contention. Those among you who are more advanced in philosophical studies might well sooner be of the opposite opinion, that an accidental being is impossible. And in speaking of what is accidental, reference could simply be made to our faulty insight into the causes which make things necessary. But to say that all things are necessary is not to say that all things are caused; and so what philosophers call a thing necessary in itself is just an *uncaused* necessary thing. One may leave open the question of what this thing which is necessary in itself is to be, whether the physical world itself or a principle which transcends this, but one has no right to reject it *a priori* as being impossible. Yet Hume believes himself to be justified in this because a necessary thing amounts to something whose nonexistence would involve a contradiction. But, according to Hume, this is never the case. For no one who simply denies a thing could contradict himself unless at the same time he accepted it. It would be contradictory to hold the same thing to be both existing and not existing, but to hold only that it does not exist cannot be contradictory. However, in arguing thus Hume rests his case on a rash assumption, namely that only what is contradictory may be considered impossible. This is not obvious. The two concepts are not identical. It is also conceivable that a judgment rejecting something could be intelligible to us through the concepts which underlie it, without the judgment corresponding to the form of the law of noncontradiction. Anyone who wanted to reject this possibility from the outset, on the grounds that only what is contradictory is clearly impossible, would contradict himself, since his rejection is not itself a case of the principle of noncontradiction. The question whether there are axioms which conform to a standard other than that of noncontradiction, can only be decided empirically. And if inquiry should show that, in fact, we human beings possess no other kind of axioms, this would hardly be to say that there are not perhaps other kinds of rational beings who could have them. And so there might also be a being of such a nature that one who possessed a sufficient conception of it would conclude from the concept itself, and without drawing upon further experiences, that this being exists. Such a being would then really deserve to be called a being which is necessary in itself; and in any case Hume was not able to say that a being of this description is known *a priori* to be impossible. We will return to this point later, when the concern will be to sift out the kernel of truth in the ontological argument.

24. The admixture of error in the Humean critique of the ontological argument obscured what is valuable in it, as often happens in such cases. It is even more obscure whether what is right about his criticism suffices to refute the ontological argument, or whether the defects in the preliminary statements rather make the main conclusion uncertain. And so many, especially Wolff and his school, continued to make use of the ontological proof. But, although the significance of the Humean critique remained inaccessible to many, it was not so to all, and we will run across the clearest trace of his influence in Kant.

C. KANT'S CRITIQUE OF THE ONTOLOGICAL ARGUMENT

25. Kant does not mention Hume by name in the detailed discussion devoted to the impossibility of an ontological proof of the existence of God in his *Critique of Pure Reason.* But here, as elsewhere when he suggests it himself, it is obvious that for the most part he also knew of the connection between his philosophy and that of Hume. And so there is a certain sense in which it might be said, if it were not for Hume there would be no Kant.

To be sure, he did not adopt everything which Hume taught; and it is precisely the errors of Hume which we have enumerated that Kant does not accept.

i. He does not teach that the existence of a thing means the thing itself;

ii. nor that belief is a feeling or a special kind of conception;

iii. nor that there could be no necessary being. Rather, in the *Critique of Practical Reason* he declares himself for the belief in God; and before that, in the *Critique of Pure Reason,* he had affirmed that the idea of God is flawless, and that His existence is an assumption which, although it cannot be proved, neither can it be denied. In addition to these Humean errors Kant rejects

iv. also the doctrine that existential propositions are not the conjoining of a subject and predicate, which doctrine ran counter to all tradition and was certainly most paradoxical to the well-established usage of his time. According to Kant, every judgment has a relation, as well as a quantity, a quality, and a modality.

26. On the other hand, Kant adheres to the doctrines that the existence of an absolutely necessary being cannot be known on the basis of the mere consideration of the idea of it, and that the denial of such a being involves no contradiction. And he also holds that a negative existential proposition does not merely deny the predicate, existence, to the subject, but denies the subject itself, too, along with the predicate. So on Kant's view it is not clear how a negative existential proposition is to contain a contradiction nor, since the principle of noncontradiction constitutes its criterion, how such a proposition could ever be known *a priori* to be untrue. An opponent would have to contend that there are subjects which cannot be denied, but he would not find any evidence of this and would be unable to think of one such subject.

Thus far Kant approves of Hume's thought in its essentials; indeed the agreement goes still half a step further. Among assertions, Hume had assigned an exceptional position to the negative existential proposition, inasmuch as the judgment which it pronounces is not to be reckoned among categorical judgments. Now this is not Kant's opinion at all; he considered the negative existential judgment to be a categorical judgment as well, but nevertheless a categorical judgment of a quite peculiar kind.

According to Kant, all categorical judgments are either analytic or synthetic; and he counts an affirmative proposition as analytic when the predicate is contained in the subject, as synthetic when this is not the case. As far as the existential proposition is concerned, Kant decides that, "as in fairness every reasonable person must admit," "each existential proposition" is "synthetic."

This general contention might appear strange at first glance. For if the existential proposition is categorical, then its predicate appears to be the concept of "being." And must it not hold of this concept, as it seems to hold of others, that it can be united to other concepts as an enriching property? If this is done, and if I make the whole (to which I have annexed the concept as a property) the subject, but the concept itself the predicate, then in fact it seems the proposition must rather bear the character of an analytic proposition.

To counter this, Kant sought to justify in the following way his contention that every existential proposition is necessarily synthetic. Existence, he says, is not a real property; that is, it is not a determination which, like 'green', 'learned', and the like is able in being added to other properties to lend them more precise determination and to enrich the content of the whole. "Thus being, when it is joined to a subject, is not a real predicate concept. It is no more a concept contained in the concept of the subject as a determination of it than it is a concept which is synthetically added to the subject as a new and enriching determination."

It is rather a predicate which is not a concept but is *the very object* to which reference is made.

Hear how Kant himself develops this obscure, bizarre theory. "Being," he says, "is obviously not a real predicate, that is, the concept of something which could be added to the concept of a thing." It is no "determination of a thing." "It is merely the positing of a thing or of certain determinations as existing in themselves. Its logical application is just as the copula of a judgment. The proposition, 'God is omnipotent', includes two concepts which have as their objects God and omnipotence. The little word 'is' is not an additional predicate, but is only what sets the predicate in relation to the subject."

Now this is also supposed to hold for existential propositions. So, this kind of categorical judgment is missing a second concept. How is this possible? Because even here the relation is one which obtains not between two concepts, but between a concept, which takes the place of the subject, and its object. "If I say, 'God exists,' I do not set a new predicate (i.e., a predicate concept) in relation to the concept of God, but only ... *set the object in relation to my concept.* Both must have the same content ... and thus what is real includes nothing more than what is merely possible (what is conceived). One hundred real Talers include not the least bit more than one hundred possible (conceptual) Talers ... But my financial situation is more improved by one hundred real Talers ... because the object is added synthetically to my concept."

28. In view of this, one has no choice but to deny all justification to the attempt at an ontological proof. Kant does this in that he says further: "Thus a being which I think of as the highest reality and flawless surely lacks nothing in its possible real content. But it is missing something in relation to my conceptual circumstances, namely that its existence also be possible *a posteriori*"----"An existence outside the sphere of our experience is an assumption we have no means to justify. And it was entirely unnatural, and a mere revival of an old scholastic joke, to want to cull out

of a mere idea the existence of its corresponding object . . . So time and trouble are wasted on this proof. And a man is no more enriched in insight by mere ideas than a merchant would be in wealth if he wanted to add a row of zeroes to his savings."

29. In conclusion, what is supposed to have proved to be the irreparable mistake of the ontological argument?

Anselm, Descartes, and the other defenders of the argument wanted to set forth the proposition, "God exists," as analytic. The denial of it was supposed to involve a contradiction. But the proposition is an existential proposition and as such synthetic in that it connects with the subject, not an abstract property contained in the concept of it, but its own object. And for this very reason it is not clear, according to Kant, "that the predicate existence cannot be denied without contradiction, since this advantage is had peculiarly only by analytic judgments as actually being rooted in their nature."

30. Kant was much acclaimed for these inquiries into the ontological argument. Where philosophers for centuries had groped in the dark he is supposed to be the first to have shed light, even so that every shadow vanished. Still, we cannot agree with this approbation. It would not be the first time that extravagant and yet undeserved praises have been lavished on a philosophical doctrine. In order to do justice to Kant's possible merits, as well as to those of his predecessors, we must find out, on the one hand, what is his own and what was handed down to him from others (among whom Hume, especially, comes into consideration), and, on the other hand, we must find out whether his doctrine is correct.

31. On some points Kant departed from Hume. In particular he did not adopt Hume's new ideas on the nature of judgment, according to which judgment is supposed to be a belief and belief a "feeling," or, as it is elsewhere called, a stronger conception, a faster hold of the object. But he stuck to the traditional opinion that every judgment consists in the relation of something to something else, and he did not except the existential propositions from this. All the same, he found it necessary to subject them to a separate analysis; and it is right here that we find in Kant an impulse which drives him closer to Hume.

That is, although Kant sees in the existential proposition a categorical judgment, still, just as Hume does, he denies that in this case two concepts are related to one another. Only one concept is supposed to be given, and the object itself is supposed to be set in relation to it. The connection with Hume seems to me unmistakable: Hume says, in the proposition, "A is existing," existence is nothing else than the object itself; Kant says, in this proposition it is the object itself which is set in relation to the concept of the subject.

So if Kant's explanation is correct, certainly a good part of the glory is Hume's.

32. But is it correct? Let us take this under consideration now. The main point of Kant's doctrine of existential propositions was that they are categorical judgments in which the relation of subject and predicate does not obtain between two concepts but between a concept, which takes the place of the subject, and its object. "If I say, 'God exists', I do not set a fresh predicate in relation to the concept of God, but only set the object in relation to my concept." "The object is added synthetically to my concept."

What is Kant thus maintaining?

The existential proposition is supposed to be categorical. But it has a peculiarity in contrast to other categorical propositions which is that, just as these add one concept to another concept, so similarly the existential proposition adds to my concept a real thing which is to be found outside myself, and which is predicated of my concept.

Is this correct?

It is not only not correct, but it is so obviously false and impossible, that I wouldn't believe Kant could have been of this opinion if his words admitted of any other interpretation, or if I hadn't found that similar mistaken opinions are to be found in other able thinkers. For example, many a scholastic philosopher, and even Thomas Aquinas, often spoke as though a judgment consisted in the comparison of thought with reality (*comparatio rei et intellectus*). This scholastic "comparison" and that Kantian "relation" amount to essentially the same thing.

But the agreement on the doctrine does not make it more acceptable to me when its impossibility is palpable. In an existential proposition an object outside of me is supposed to be predicated of the subject, just as in other cases a second concept is? Isn't this a monstrous contention?

a) The predicate is a part, so to speak, the one half of a categorical judgment. How could a judgment be half within me and half outside of me?

b) And if I judge, "The emperor of Japan exists," how many miles long must my judgment be, since it begins with the subject in my mind and ends with its predicate in Japan!

c) Also, there are false existential propositions. Now how shall they be completed, since the object does not exist? How could such an object be added to my concept?

d) Kant spoke facetiously of a merchant who, in order to improve his savings account, wanted to tack zeroes onto it. Ridiculous as the thought is, it still seems hardly as bizarre as this alleged creation of a connection between a concept as subject and a real thing as predicate. And it is impossible to assume that Kant came to realize the content and import of his contention. It absolutely will not do to take the existential proposition for a categorical judgment in which the real object itself takes the place of the predicate concept. If no second concept is there, then no predication obtains, that is, we have no categorical proposition in that case. Anyone who grants to Hume that there is no second concept must unconditionally admit that he is right in holding the proposition is not categorical.

33. Thus, at least on this point, what Kant maintains is certainly untenable and in need of correction. If one sticks to the view, as he does, that the existential proposition is categorical, then one will also have to say that it has a predicate concept as well as a subject concept. And "existence" will be the only such concept to be considered in this case.

But again, it is not obvious why an existential proposition is not supposed to express an analytic judgment under any circumstances. And what prevents us, then, from seeing as analytic precisely the proposition, "God exists?" Descartes did so, because eternal and perfect existence,which is necessary in itself, is clearly and distinctly included in the concept of God as the infinitely perfect being. Is this not the case? Kant does not want to admit it, but don't Descartes and especially Leibniz seem to be right about this?

34. Let us consider the matter in the following way: One might perhaps rightly dispute the idea that existence is, generally speaking, a perfection (since there are bad things, too, and "there are" means the same for them as it does for good things). And again, one might dispute the idea that existence is a reality (since one says of faults, of possibilities, and of impossibilities that they exist). But does it not nevertheless remain a *conditio sine qua non* of a good thing that it exists if it is to have all its good characteristics (*primum est vivere* . . .)? And isn't existence the requirement of a real thing if it is to possess all its real determinations? As surely as a round square is a *contradictio in adjecto*, so is a God without an absolute and immediately necessary, perfect being, which is entirely self-sufficient and thus independent of all other things. Contingent being and infinitely perfect being are mutually contradictory. To be dependent upon something else, or somehow restricted, and to be infinitely perfect are mutually contradictory. To be not even a possibility and to be infinitely perfect are mutually contradictory. For the possibility that something lacks existence at some time--whether or not existence itself is taken to be a real characteristic or a perfection--is the possibility that it lacks all its perfections at some time. Kant says, a hundred Talers that are merely conceptual are not one single Taler less than a hundred real Talers. But it seems to me that they are in fact a hundred Talers less. The possibility that it lacks existence would thus itself be an imperfection in

the infinitely perfect being, and in any case, such a possibility would be grounded in an imperfection. A being which can be and not be can no more be an infinitely perfect being than a figure, the sum of whose angles exceeds that of two right angles, can be a triangle. Thus far Descartes and Leibniz are right.

35. But in light of this the ontological argument seems again to be completely rehabilitated.

> It belongs to the essence of God that he is infinitely perfect.
> What is infinitely perfect is necessary in itself.
> What is necessary exists.
> Therefore God exists.

36. Thus stated, is the argument really correct and unassailable?

No, neither in this form nor in any other which has been attempted or is to be attempted. It may be said, once and for all, that it is not true that the proposition, "God exists," or "God is necessary," is evident *a priori* in itself and through its concepts as is the proposition that all triangles have three sides and three angles.

There is no doubt that the ontological argument has reduced many to silence. One doesn't know how and by what means to resist its logic; but still one has the feeling which one also has in other cases when one feels oneself caught in a sophism. One must concede outwardly, but is not convinced inwardly. Indeed, I would like to hold that even those who adopted the ontological argument and made use of it as a point in favor of the belief in God, could not have been satisfied as they are in other cases by evidence and proof. And at first, like everyone else, they certainly had the impression that the proof consists not entirely in mere sleight of hand but that magic also plays a part in it, that is, that there is something uncanny about it.

But where is the mistake?

Parturiunt montes, nascitur ridiculus mus.

The ontological argument is a very common logical blunder, a fallacy of equivocation. At first this might seem hardly credible, in view of the great philosophers who have troubled themselves with it. But I hope to show in the next lecture that it is so.

D. DEMONSTRATION OF THE MISTAKE MADE IN THE ONTOLOGICAL ARGUMENT

37. Our task is to arrive at a definitive judgment of the ontological argument. I have already made known my conviction that our judgment can only be to reject it, and at the same time I have declared that it is a paralogism by equivocation.

This contention might come as a surprise to you. This kind of a fallacy seems to be the crudest blunder to be noted among paralogisms. If one is confused by sophisms like Zeno's against motion, or disconcerted by arguments like the oath taken against oneself--I swear I'm not telling the truth[7]--then that's understandable. But to fall prey to a paralogism by equivocation, that seems to be what happens only to a weak and unpracticed faculty of reasoning!

To overlook the difference in the thoughts connected with similar expressions--doesn't that betray the utmost carelessness, the most casual superficiality? And here, where we see first-rate thinkers, like Descartes, Leibniz, Hume, Kant, taking on the most lengthy and most basic inquiries, are none of them supposed to have noticed the mistake, such that indeed some considered the paralogism valid, and the others, challenging them, were unable to point out the essential fault of the argument?

38. Anyone who speaks this way shows that he has not studied the history of knowledge nor the nature of equivocation sufficiently.

The history of knowledge shows that no one has such a great mind that he does not need carefully to guard himself against fallacies of equivocation. They have been especially devastating to philosophy, and none of the great thinkers has been entirely spared these false steps. They are attributed to Plato as well as to Parmenides, to Kant as well as to Descartes, to Herbart as well as to Hegel.

Our astonishment at this is tempered if we come to know more completely the range of equivocation and the variety of guises it assumes.

To be sure, he must be a pitiful simpleton who is deceived by equivocations on such terms as ruler, jack, to list, to order, and the like.* But there is a very significant difference between these and other equivocations, especially those which have deceived great thinkers.

Aristotle noticed the essentially different characters of equivocation and they seemed to him to be worthy of the attention of logicians. He himself distinguished three classes among equivocations: 1) those which have more than one meaning by accident (the ruler on the workbench and the one on the throne); 2) those which have different meanings by analogy to different things (bright colors--bright tones); and 3) those which are equivocal by being related to the same object (as a healthy complexion and healthy food are related to a healthy body). But with this the variety even of equivocal names is by no means exhausted. As an example of a very common kind, I mention the restriction through which a name acquires a narrower sense (the sun--in the strict sense of our sun; the understanding--for Anaxagoras in the sense of the divine orderer of the world).

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* Brentano's German examples are: "*Hahn, Mars, vergeben, aufheben*" [Tr.]

There is equivocation on all names by means of three kinds of substitutions in that the same word sometimes substitutes for the thing (man is an animate being), sometimes for the concept (man is more general than European), and sometimes for the word (man is a noun). One can add to these as a fourth the equivocal reference of proper names (Jagsthausen is a village and a castle on the Jagst).

It is also to be noticed that equivocations are not only to be found among names (nouns and adjectives) and verbs, but also among particles, prepositions, conjunctions (as: sometimes meaning while, sometimes meaning like), and inflexions.

But equivocations are likewise to be found among syntactical connections (in that, for example, an adjective sometimes determines and sometimes modifies. Examples of the latter kind: a counterfeit guilder, a dead bird, a conceptual Taler, a former Secretary, an alleged criminal.)

Any equivocation of this kind can bring about confusion if it is not recognized for what it is. Thus, for example, the ambiguity of a syntactical connection is responsible for the controversy among logicians over whether the placing of the determining term is irrelevant. It is irrelevant if the predicate functions determinatively (a "big thing which is round," a "round thing which is big"). But it is not irrelevant if the predicate modifies ("a rich man has become poor" doesn't mean the same thing as "a man who has become poor is rich"; "a person is deceased" doesn't mean the same thing as "the deceased is a person").

An equivocation is especially dangerous when one has not made the sense of a name or of a syntactical formula sufficiently clear, or, in general, when one does not think of the possibility of an equivocation. This often happens with very common and very frequently used expressions, because in these cases, on the one hand, the degree of abstraction poses difficulties for the one attempting a definition, and on the other hand attention easily slips when something is all too habitual. This is especially so in the case of syntactical forms, where even those who have learned to look out for equivocal names are not accustomed to thinking of such a danger. Logic has all the more reason to dwell upon the subject with great care.

39. Now precisely such a case is presented by the ontological argument. But it was not always the same equivocation by which its supporters were led astray. Rather, some took a proposition, the sense of which is negative, for an affirmative one on account of the agreement of its expression with that of other affirmative propositions. And others took a merely nominal definition for a real one.

Let us first make the possibility of these fallacies clear in general;

1. *On the possibility of confusing a negative with an affirmative determination.*

The most common form of an affirmative judgment is "S is P." A proposition thus constructed is "some person is happy," which expresses an affirmative judgment and says the same thing as "There is a happy person." But it can happen that we express *negative* judgments in a form which sounds exactly the same, for example, in what the logicians call the principle of identity: "A is A." So it can easily come about that such a judgment is taken for an affirmative one and used as such.

Perhaps you are also inclined to do so. And so this may be the place for me to demonstrate the contrary and to show the different meanings of the identical sounding formula in the one case and in the other.

The proposition, "A person is happy," includes a real, affirmative judgment, namely the admission of a connection between a person and the characteristic "happy." We could rightly say, it means the same thing as the proposition, "There is a happy person."

Now let us assume something similar holds for the so-called law of identity, "A is A"--to put a more definite term in place of A, "A human being is a human being." Then the proposition would mean the same thing as, "There is a human being which is a human being." And since "a human being which is a human being" means no more than the simple expression, "a human being," it follows that "A human being is a human being" says the same thing as "There is a human being."

Is that right? No! The law of identity is intuitively obvious; that a human being is a human being is evident *a priori*. But that there is a human being is not evident *a priori*. It is also by no means a necessary truth; and there really weren't any human beings a hundred million years ago, if Thomson's calculations are to be trusted.

But what is the sense, then, of "A is A," of "A human being is a human being?" Not, "There is a human being which is a human being," but rather, "There is no human being which is not a human being." The proposition does not assert that there is a human being which is a human being; but it denies that there is a human being which is not a human being. And this is in truth intuitively obvious, for the contrary would be a contradiction. (You see, incidentally, that the current logic texts incorrectly list the principle of identity as a second principle different from the principle of non-contradiction. Only the verbal formulation is different; the idea is the same.)

All the principles of mathematics are of this kind (insofar as they are truths which can be known *a priori*), that is, they appear to be affirmative, but their meaning is negative. And this is consistent with the fact that the truth of a proposition like "a square has four sides" is independent of the existence of real squares.

These examples will surely suffice to illuminate the first of the two confusions which I said creep up on the defenders of the ontological argument. Before I undertake to demonstrate the second confusion, let me make a few remarks about the nature of it.

40. 2. *On the possibility of confusing a nominal determination with a real one.*

This case may be more familiar to you than the first. That is, the little word 'is' often amounts to the same thing as 'means.' If I say, for example, "The squaring of the circle is the construction of a square which has the same area as a given circle," I mean to say no more than that by the squaring of the circle one understands such a construction. Nothing is hereby said about whether there is such a construction, nor about whether it is even possible. What is supposed to be indicated is only the meaning of a name, which can extend to something quite imaginary. So I can even define a wooden flat-iron as "an iron thing made of wood."

The proposition which is indisputable, thus understood, becomes an error and an absurdity as soon as one interprets it as real instead of nominal; that is, when the 'is' is supposed to signify not 'means' but 'exists.'

41. Let us turn back to our ontological argument after this digression on the most important kinds of fallacies of equivocation. I said that the error which is committed in it, and indeed in each of its forms, is a paralogism by equivocation, in that either a nominal determination is confused with a real one, or a negative judgment is confused with an affirmative one.

A. In confusing a nominal determination with a real one, the argument says:

An infinitely perfect being has necessary existence.
God is an infinitely perfect being.
So God has necessary existence.
Therefore God exists.

But what is meant by, "God is an infinitely perfect being?" There is a God who is an infinitely perfect being? That would be to understand the determination as real, but presupposes what is to be proved, namely the existence of God.

Or does it only mean, "By God an infinitely perfect being is understood?" Then the proposition is unobjectionable, but it yields no conclusion other than that by God a being which has necessary existence is understood. Then the question remains open whether such a being exists.

42. If no other confusion than this lay at the base of the ontological argument, then it surely would not have lasted for long, since this confusion is not hard to see and the critics actually objected to it repeatedly. But the critics were not always effectively convincing about this, because the advocates of the argument did not take to heart the

reproach that they had confused a nominal determination with a real one. Descartes, for example, definitely refused to acknowledge that this charge could be made against himself, although he was ready to grant that this was in fact the mistake made by the old argument of Anselm, for which Thomas Aquinas had already blamed it.

Now the other error is certainly at the bottom of Descartes' argument:

B. the confusion of a negative judgment with an affirmative one.

In order to ascertain the place of the error in Descartes' argument, let us repeat it:

> What we know clearly and distinctly to belong to the nature of a thing (what is contained in the concept of a thing) we may with certainty affirm of this thing.
>
> We know clearly and distinctly that it belongs to the nature of the most perfect being to have eternal existence which is necessary in itself.
>
> Therefore it may be affirmed of God that he has existence which is necessary in itself; that is, God has existence which is necessary in itself.
>
> Therefore God exists.

The danger of confusion already lies in the major, in the word 'affirm.' That is, what is contained in the concept of a thing may by no means be affirmed of it categorically, but only hypothetically. In other words, we may not maintain *a priori*, affirmatively, that the subject has this determination, but only negatively, that the thing cannot fail to have it if it exists.

In light of this, the present instance does not result in the conclusion--

God has existence which is necessary in itself, but rather only--

There is no God without existence which is necessary in itself.

43. I believe what has been said is sufficient. But it might serve to show quite clearly just how completely misguided the ontological proof is if we bring to mind some examples of what all one can prove *a priori*, just as well as the existence of God, by losing sight of the ambiguity of the affirmative formulation of propositions.

For example, the existence of a shoemaker.

> In the concept of a shoemaker is contained the fact that he can make shoes.
>
> What is contained in the concept of a shoemaker can be affirmed of him. So it can be affirmed with certainty of a shoemaker that he can make shoes, and it is intuitively obvious that he can make shoes.
>
> But how is he supposed to make shoes if he doesn't exist?
>
> Therefore a shoemaker exists.

Or the existence of a golden mountain:

What is golden exists.
A golden mountain is golden.
Therefore a golden mountain exists.

The existence of a Stone Guest (it is contained in the concept of such a guest that he is made of stone and that he accepts invitations . . .); the existence of the man in the moon (in the concept of whom it is contained that he lives on the moon). In the same way, Snow White and Sleeping Beauty, Rose White and Rose Red,the old man of the mountain and all the enchanted characters from the world of fairy tales are to be transformed into historical figures.

E. THE TRUTH WHICH IS CONCEALED IN THE ONTOLOGICAL ARGUMENT

44. We have showed that no form of the ontological argument for the existence of God can be considered a valid proof, and we have showed why this is so. It is a paralogism on account of equivocation and numbers among the cruder blunders. One would not think that Anselm, Descartes, Spinoza and Leibniz could make a mistake like that. Considering that, on the contrary, they did, should one begin to have doubts about the sharpness of their minds? A look at their other great achievements guards us against these doubts. Also I would not like to explain their oversight with the saying, *quandoque bonus dormitat Homerus*, because this would not explain how it could come about that they repeated it after one another. Certainly they weren't all of them asleep, even if one serves to excuse the next in a certain sense.

It wasn't exactly so easy to get to the bottom of the mistake as it is now to understand it, since it lies in plain sight. Even the opponents of the argument, for the most part, did not expose the true error and the deepest root of the fallacy. Thus Kant did not notice the equivocation between negative and affirmative judgments. He did touch on it a little bit when he distinguished at times as follows: "The unqualified necessity of the judgment is not the absolute necessity of matters of fact. For the absolute necessity of the judgment is only a qualified necessity of the thing or of the predicate in the judgment. The proposition that a triangle necessarily has three angles does not say that three angles are absolutely necessary, but rather it says, provided that there is a triangle then there are also three angles necessarily in it" (*Critique of Pure Reason*). Here something true is touched upon, but something false is mixed in with it. It looks as though Kant here anticipates Herbart's doctrine according to which every categorical proposition is to be understood as hypothetical, but this is decidedly incorrect. ("Caius is dead" does not mean, "If Caius exists then he is dead," and "Brutus is alive" does not mean, "If Brutus exists then he is alive.") Also, Kant already betrays the fact that he himself has succumbed to the confusion of affirmative and negative judgments when he gives his incorrect definition of analytical judgments (namely that in them the predicate is included in the subject either overtly or covertly).

Generally speaking, then, logicians up to the present day have not understood the true character of the mistake in the ontological argument. And thus they succumb to it themselves all over again, since they take the law of identity to be different from the law of non-contradiction, and consider universal laws--as for example the mathematical ones--to be affirmative judgments.

45. In addition to this, another factor may lend the argument some tenacity: the fact that the men who advocated it did touch on some truth in doing so. This holds for what Leibniz said as well as for what Descartes and Anselm said before him.

A. To be sure, it is right to say that the existence of God can no more be inferred from his nominal definition than can the existence of any other object from its nominal definition. Nevertheless, there is a difference between God and other things insofar as one must conclude, if it is given only that God is possible, that he therefore really and necessarily exists. Usually only the reverse inference--from the reality to the possibility--is permitted.

This is easy to prove.

1. In order to grasp the proof one has only to understand clearly what the word "*possible*" means in the strict sense of it. For we often use it in an imprecise sense, namely for that

of which it is not *certain* that it doesn't exist,

while here it stands for that

of which it is not *necessary* that it doesn't exist.

In order to declare the former of something, it suffices that one not know that the thing doesn't exist.

The latter requires that one know that the thing is not impossible.

The opposite of the former is *certainly* false.

The opposite of the latter--*necessarily* false.

2. Furthermore, one must clearly understand which concept one means to unite with the word "God." We can say, with Descartes, that one understands by God a being which is necessary through itself, eternal, and infinitely perfect. Or we could simply give the last of these determinations alone. For an infinitely perfect being would not be infinitely perfect if it did not exist. And likewise, it would not be infinitely perfect if it were, not *necessary*, but rather only accidental. Existence itself may or may not be a perfection, but it is certain that the lack of existence would be the lack of all its perfections. And also, even the mere possibility that it lack existence is therefore to be ruled out in the case of

the ideal of all perfection. That its existence be necessary appears decidedly preferable to this possibility.

Thus the concept of infinite perfection in itself already comprises that of eternity, and also that of necessity (indeed of necessity through itself), since even any dependence upon something else is contrary to the concept of the infinitely perfect being. Therefore no one has ever taught that there is an infinitely perfect being without thinking of it as necessary through itself.*

When the concept of God is thus understood it is indubitable, as has been said, that the mere admission of possibility suffices to prove the reality. For if it is possible that God exists, then either

it is possible that he exists as well as possible that he does not exist,

or it is only possible that he exists and not possible that he does not exist.

But the first is demonstrably false; therefore the second holds true.

Proof: If it were equally possible for God that he exists as that he does not exist, then nothing impossible could result from the assumption that he exists.

But then there would be a being which is eternal, necessary through itself, and infinitely perfect, which is possibly such that it does not exist, and which is thus accidental (contingent), and this is absurd and impossible.

Thus there remains only the other option, for the case in which the possibility of God is given, namely that it is only possible that he exists and not possible that he does not exist.

Therefore it follows that whoever is certain of the possibility of God is certain also of his reality.

46. I know from experience that this argument easily arouses suspicion. One fears that, as with the ontological argument as we have become acquainted with it, there is some question of a logical trap. But such fears are unjustified; and in order to dispel them all I want to dwell upon this point a little.

1. The argument is essentially connected with the logical principle that whatever is such that if it is true it is necessarily true, and not accidentally so, is also such that if it is false it is necessarily false, and not accidentally so.

2. The correctness of this principle is easily illustrated by mathematical examples.

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* Aristotle, *Metaphysics*, Book XII, Chapter 7. εξ ανάγκης άρα εστὶν ὀν. καὶ ἧ ανάγκη καλῶs, καὶ ούτωs αρχή.

Since truth in the realm of mathematics is obvious *a priori*, none of it is accidental. If a mathematical proposition, for example $7+5=12$, is true, then it is necessarily true. If one were to lay down a mathematical law which was false, then it would be, not merely false, but rather necessarily false.

3. Consequently, if anyone were to admit that some mathematical law is not necessarily false, then that would be to admit that the law is actually not false, and therefore, that it is true. In other words, its truth follows from the possibility of its truth.

4. Now the same holds also for the proposition, "God exists." For it is no more a question of accidental truth in the proposition that God exists than it is in mathematical problems. If it is true, then it is not accidentally but rather necessarily true; and therefore if it is false, it is not accidentally but rather necessarily false.

5. Now if someone concedes that God is possible, and therefore that the proposition, "God exists," is not necessarily false, then we can immediately conclude that the proposition is actually not false, and therefore that God exists.

47. I would like to give this idea a somewhat different formulation, too. Whatever can come into question is either necessary, or accidental, or impossible. Concerning the being which is necessary through itself, it is certain of it above all that it is either necessary, or accidental, or accidentally non-existent, or impossible. But no one will maintain that it is accidental, for then it would be, in case it existed, both necessary and accidental at the same time. And if it is impossible that it be accidentally existent, then this is to say that it is impossible that it be accidentally non-existent. For it lies in the concept of the accidental that if accidental existence is possible then so is accidental non-existence, and vice versa.

So in this case there remains from the outset only the following disjunction: either the being which is necessary through itself is necessary or it is impossible. Now if anyone concedes that it is not impossible, then he obviously admits something from which it follows that this being is necessary and therefore exists

48. I hope that this repetition of the matter in various forms will suffice. It is not a question here of any kind of logical trap, but of a rigorous inference, which is not to be rejected without contradiction. Perhaps this method of argument will appear less astonishing if I point out that many, for example Albert Lange, believed it possible to derive reality from possibility in all cases. That is, they thought they understood in general that there are no accidents, i.e., that nothing is, nor could be,

except for what is necessary. Hence if anything in any instance were recognized to be possible, then this would be as much as to recognize its reality and necessity, which latter could be inferred from that possibility. Now what these thinkers teach for all things which can come into question holds, in any case, for the concept of the being which is necessary through itself. It cannot be, without being necessary. Therefore, in the admission of its possibility is involved that of its reality.[8]

49. Thus far, then, Descartes and Leibniz were certainly right. But they made a mistake in that they thought the proof of possibility to be so easy. In truth we can no more acquire the proof of possibility from the mere concept than we can that of existence.

Descartes' opinion was that our concept of God must be admitted to be possible; for it is clear, therefore without contradiction, therefore possible. Leibniz defined God, the infinitely perfect being, as the "all-real being." But in this concept there would be found nothing but positive determinations, and not a single negative one, and hence also no contradiction. And so its possibility stands beyond a doubt.

However Leibniz here overlooks, above all, that not only contradictions but also contrary predicates (like here and there, red and blue) are mutually exclusive with respect to the same subject. Thus the union of all empirical perfections (realities) is not only to be doubted as to its possibility, but it is plainly to be recognized as impossible. And if God is really supposed to be the all-real being in this sense, then his non-existence would be established *a priori.*

This absurdity would be heightened if, as many theologians hold, the infinitely perfect being possessed not only all conceivable real determinations but also each of these to an infinite degree. But thus even a single characteristic in itself, aside from its compatibility with all the others, would be reduced to absurdity since--as for example even Leibniz repeatedly pointed out--an infinite circle, an infinite velocity, an infinitely intense heat, are contradictory.

So the opposite of what Leibniz held to be true would appear to be evident. So far from it being the case that our concept of God would guarantee his possibility, it would rather result directly from our concept that he is impossible. But none of the great theists would really feel devastated by this argument. They would just never allow that the union of all empirical perfections belongs to the content of the concept of God.

50. Some go so far as to teach that our concept of God includes no positive characteristic derived from experience. The being which is necessary in itself would instead be thoroughly transcendent for us. As is usual with such things, we have to try to explain the divine transcendent being to ourselves by means of substitutes for the precise concept which we lack. We sometimes think of it by means of denying something of it

absolutely (transcendence itself is such a negative determination; likewise when we think of it as non-spatial, as beyond all external influence, etc.). Sometimes we attribute to it certain positive predicates of experience, conscious that they do not hold in the strict sense but rather only by analogy. Even Theophrastus recognized the importance of such predication by analogy. In order to make clear the sense of this, I call attention to the example of a color-blind person. Dalton was well aware that there are colors which he could not imagine vividly; but he thought of them as being in a certain way analogous to the ones he did see. We can similarly conceive of all the ideas of a sense which we lack, but which perhaps an animal possesses analogously to the way in which we possess our senses. And again, we can think of geometrical figures in *n* dimensions in analogy to the three-dimensional space of experience.

Thus many say that it is to be understood not in a strict sense but rather only in this somehow analogous sense, when we call God a thinking, knowing, willing being--indeed in general when we call him a being or a real thing.

By means of this appeal to a merely analogous concept, therefore, it has been attempted to escape the objection that our concept of God includes absurdity. Examples are cited from mathematics, in which what is contradictory becomes possible by being taken as merely analogous. A constant quantity appears to be analogous to a discrete one which is put together out of infinitely many, infinitely small parts. The latter is contradictory, the former is not. A circle can be conceived as analogous to a regular polygon with infinitely many, infinitely small sides. The former is possible, the latter absurd.

51. But it seems to me rather risky to justify the concept of God in this way. For where is the boundary that separates this so-called analogical theology from complete agnosticism? If God is not supposed to fall under even the highest of our general concepts, then he also does not fall under the concept of "something." But this would mean nothing else than to deny him absolutely. And so there is no real difference between such agnosticism and utter atheism. For the advantage with regard to clarity would clearly be on the side of the atheists.

But if God can fall under any positive concept at all, why not under such as are less general than that of "something" (which means the same as "real thing")? Why should it be ruled out *a priori* for us to think of the being which is necessary through itself as known or unknown, as knowing or unknowing, as willing or not willing? Will it not rather be necessary that one of the alternatives in each of these pairs be true?

One would judge the matter too hastily in imagining that we are made directly capable of knowing *a priori* the possibility or the existence of God by the possession of any real and positive concept which would be applicable to him. For that would rather require a completely determined and perfectly adequate idea of God, the intuition of God, which we, on the contrary, certainly do not possess. David Hume recognized quite rightly that an incomplete concept of a being which is necessary in itself would not suffice to make its necessity known *a priori*. And (since he disregards the fact that, as we mentioned earlier, the concept of a being which is necessary in itself seemed altogether unacceptable to him), he asks at times: "Who can prove to me that not even this world itself is directly necessary?" But he did not deny that we are in possession of some positive concept of the world. And thus he indicates that our possession of positive concepts which are applicable to it would be entirely compatible with the impossibility of deciding *a priori* as to the existence of a being which is necessary in itself

However that may be, if one takes seriously this talk of a merely analogical knowledge about God, then it is really pure atheism. For the clear-thinking atheists have not even gone along with it. It first arose in a time of decline, in the philosophy of the Neoplatonists. Leibniz in particular stayed clear of it.

52. But how does he then escape the objection that the concept of the all-real being is self-refuting? As we saw, nothing is gained by the excuse that the "all" is not meant seriously. On the contrary, it must be said that the concept of the infinitely perfect being does not even coincide with that of the all-real being, and that whoever identifies the two creates an entirely unnecessary difficulty for himself. In the concept of the infinitely perfect being there is contained no more than the following: A being of such perfection that every increase in its worth would result in an absurdity. In other words, the concept of God is surely that of an absolute good which is not to be surpassed by anything, but it is not that of a union of all conceivable finite virtues.

If we understand the concept thus carefully, it includes no evidence that it is to be rejected *a priori* as contradictory. But on the other hand, it certainly does not suffice to permit us to make an *a priori* judgment as to the possibility of its object.[9]

53. With this, however, Descartes' formulation of the ontological argument is also disposed of. According to him, the possibility of God is already established *a priori* on account of the clarity of our concept of God. But whatever else may be understood to fall under his famous criterion of truth--clarity and distinctness--our concept of God is not at all clear in the sense of perfectly determined. To point out just one consideration: If we may imagine God to be a thinking being, then this being is surely not one whose thinking is of the nature of an accident or property as ours is, but rather God is *substantially* a thinking thing. The general concept of thinking may have application to this, if we abstract from the way it appears to be defined in our experience; but we have no intuition of what

is to be put in its place in the concept of God. In other words, we may well be able actually to imagine what our thinking has in common with the divine thinking. But we cannot imagine what distinguishes that which is substantially a thinking thing from that which is merely accidentally a thinking thing. So the situation in which we here find ourselves can perhaps be compared with that of a person who is blind to the color red, who surely has at his disposal the proper concept of a colored thing, but not the specific difference of this concept which is in question.

54. Thus it is agreed: We are not able to know the possibility of God on the basis of our concept of him. In the *Critique of Pure Reason* it is said, of the idea of a highest being, that "it is not even able so much as to enlighten us about the *possibility* that there is more than one. It cannot be denied that the highest being has the analytic mark of possibility, that mere affirmations of its qualities (realities) do not produce any contradiction. But the connection of all real characteristics in one thing is a synthesis about the possibility of which we cannot judge *a priori*. *For the realities are not available to us specifically.* And even if they were to be, no judgment at all would be contained in them because the mark of the possibility of synthetic knowledge is always to be sought only in experience--to which, however, the object of an idea cannot belong. Thus the famous Leibniz scarcely accomplished what he flattered himself with, namely to be able to understand *a priori* the possibility of such an exalted, ideal being."

Nevertheless Leibniz' thought remains correct on one point--Kant notwithstanding--in that from the possibility of God, if it is evident to us, his reality is directly to be inferred.

55. B. This leads to the second point: If--instead of an imperfect concept--we had the complete intuition of God, then from it we would know his existence, i.e., we would know his necessity directly. And we would not know it in the way we know our own existence as a thinking being, for this latter does not follow from the content of the idea but rather from the way it is grasped, and for that reason we also do not know ourselves to be necessary. So we would not know the existence of God in that way, but rather in a different way peculiar to this object of thought, which is best compared to the way in which we know the necessary non-existence of something which is composed of mutually contradictory characteristics. For God is actually in himself necessarily existing, while the other is in itself necessarily not existing. The proposition, "God exists," is therefore *in itself* and *per se* equally as evident as is the proposition "a round triangle does not exist." And if we do not know it in this way, it is only because we are lacking the adequate idea of God.

All the same, one could doubt whether the proposition which is directly necessary in itself would really be evident to us, because it always remains questionable whether our minds would possess the power of judgment sufficient for it. But this doubt would not be in order, in view of the sublime faculty of imagination required. Anyone capable of such a perfect idea of God would surely not lack the power of understanding which springs from it. It only remains to question whether it is actually possible for any other than the infinitely perfect being itself to share in such an idea. But these considerations go beyond the present inquiry. For us it is enough to establish here that the proposition, "God exists," would really be a directly evident truth for one who had the adequate idea of God at his disposal.

And therefore the Anselmian argument contains something true and profound on this point. Only it does not make the proof of the existence of God superfluous, since it is rather first by means of the proof that information about the correctness of this contention is to be secured.

SECOND PRELIMINARY INQUIRY

IS IT EVIDENT *A PRIORI* THAT THE EXISTENCE OF GOD IS IMPOSSIBLE TO PROVE?

56. In sharp contrast to the view we've been discussing, others declare that it is evident *a priori* and before any attempt is made that the existence of God is impossible to prove. Some give the reason that it is evident God does not exist, others that the nature of this subject does not admit of a strict proof. The latter view is advocated quite frequently, and with more plausible reasons. But we mean to treat the former first, in order to ascend from the easier to the more difficult.

I. REASONS WHICH ARE SUPPOSED TO MAKE IT EVIDENT *A PRIORI* THAT GOD DOES NOT EXIST

57. *1st Argument*: The concept of God is contradictory. An infinitely perfect being must possess every perfection. But this is certainly impossible, just as it is certain that among the perfections which experience shows us in things there are those that can surely exist in different objects separately but never in one and the same object together.

Thomas Aquinas proposed the following argument:

> *Opposita non possunt esse in eodem.* [Opposites cannot exist in the same thing.]
>
> *Sed perfectiones rerum sunt oppositae.* [But real perfections are opposites.]
>
> *Cum ergo opposita non possint simul esse in eodem, videtur, quod non omnes rerum perfectiones sint in Deo.* [Since, therefore, opposites cannot exist together in the same thing, it is clear that not all real perfections exist in God.]

But neither he nor any other great theist found it valid, and it cannot impress us either, since the refutation of it has already appeared as a result of the inquiry into the ontological argument. The concept of the *ens realissimum* is contradictory, but it does not coincide with the concept of God.

58. *2nd Argument*: By "God" we understand a being which includes all perfection in itself and is the cause of the existence and the perfection of all other things.

In thus conceiving of him we attribute all reality and all perfection to God, and yet assume there is reality and perfection apart from what is his, which is contradictory. If he has all perfection, then there is no perfection left over for anything else. All finite things must be lost in the infinite being.

Reply: It is not true that no perfection would be left over for something else, but rather only that no perfection is conceivable which would be an increase in perfection for God himself.

a) A motion is not made slower because something else is moving. And a copy does not reduce the beauty of a painting. Just that something has a certain perfection does not by itself mean that it is impossible for anything else to share in this perfection, too. The argument reminds one of the sophism with which Gorgias contested the communicability of knowledge: The same idea could not exist in both the speaker and the hearer. (As though the communicator were deprived of the idea by "communicating" it!)

b) Besides, the argument is obviously connected with the false formulation of the concept of God--which we've already rejected--as the synthesis of all conceivable reality and perfection. But as always, God is plainly to be thought of as being of infinite value, but not as being an infinite sum and augmentation of all finite values.

59. *3rd Argument*: The most common way of attempting to disprove the existence of God is to infer his non-existence from the imperfection of the world. We think of God as the infinitely perfect cause of the world. An absurd thought! The work of an artist is as good as his art is. The work of an infinitely perfect artist must be infinitely perfect. The world, however, so far from being infinitely perfect is full of wickedness, suffering, and disorder.

Reply: a) The charge is not applicable in our case because an infinitely perfect work of art is a contradiction. Thus infinitely perfect works are not possible for the infinitely perfect craftsman; but only those are possible which become more perfect *ad infinitum*. The measure of his power is neither a finite thing nor an infinitely perfect thing. But there is no problem with the idea that he is forever creating works which are more and more perfect.

Objection: Even if his works are not infinitely perfect, still each of them must be faultless in its own kind.

Reply: b) Of course. But is our fault-finding even warranted? This would have to be shown, and one would be mistaken in assuming it is an easy matter to do so. It is astonishing how childishly, and superficially, the usual fault-finders proceed. The appropriateness, to the ultimate goal, of more remote circumstances can only be judged in the light of knowledge of the final purposes and the final dispositions of things. If the creation is a work of art, then the purpose is the whole of it; if it is a rationally ordered development, the purpose is the end toward which it strives.

What we are acquainted with are only remote preparatory stages, and moreover only limited parts of these. Neither the final state, nor its immediately preceding stages, nor even the present situation of the universe, is known to us on a large scale. So isn't it virtually certain that we know and understand too little of the work of God--if the universe is his work--in its various aspects to be able to raise the objection of disorder and inappropriateness?

Later we will return to certain objections of this kind in greater detail. And perhaps then we will not only understand that no sure trace of disorder or inappropriateness appears in the universe taken as a whole, but we will also understand that even on the basis of the traces of order which we encounter we can know with certainty--albeit very indirectly--that this order is the best possible.

60. Here we will just make a few remarks in order to prevent misunderstandings and to resolve an apparent contradiction.

a) I said that the final purpose is the standard for evaluating the means to it and the preparatory conditions.

b) I said further that an infinitely perfect work is unthinkable. The first of these statements could give rise to the impression that I believe in an end of the universe, or at least in a conclusion of it at a permanently enduring completed state. The second statement could appear to contradict the "best possible order."

Concerning a): On the contrary, I declare that it is not at all my opinion that the universe will end, or be completed. The final purpose of an endlessly progressing development is the whole of the development itself. That is, the whole of the development is to be regarded as that for the sake of which the parts exist, did exist, or will exist.

Concerning b): One must distinguish between real and unreal infinity. A completed infinite work--as I have already conceded--is contradictory. But a work which endlessly approaches perfection, a work which develops ad infinitum, is not contradictory.

You say, "This world must be the best of all:
The best would choose the best he could create."
Another says, "It's not the best at all!
It's not the measure if God's might is great."
But listen here, you two who quarrel so!
The world *exists*? -- No! It's *becoming*, though.
Surpassing each good's measure, endless toward
What is too high to reach it strives to go
From like to like the image of the Lord.*

In light of this interpretation it appears probable that the development began with what is least perfect. The more imperfect the beginnings from which the work unfolds, the more sublime is the spectacle of this development. Compared with what may follow (and if a God exists, with what must follow), the whole history of the world which has elapsed up to now appears to be only a feeble prelude to an infinite and infinitely sublime drama. When things are viewed this way, the doubts of the pessimist must seem quite petty, arrogant, and rash to the theist. At this point we are still far from deciding for or against theism. But we may already establish, as the conclusion of the considerations we've reflected upon, that no final judgment between optimism and pessimism is to be obtained as long as the question of God's existence itself remains unanswered.

61. *4th Argument*: The previous argument maintained that too many evils exist in the world for it to be regarded as the work of an infinitely perfect being. The theists could not defend their thesis against this by denying that there are genuine evils in the world. But they did say it hadn't been shown that the evil outweighs the good in the world. The evil in the world stands in necessary connection with the good; and so it would appear to be justified to allow evil in particulars, in view of the perfection and goodness of the whole.

However the existence of evils in the world is still used in quite another way as an argument against the existence of God.

Evil has come to be in the world. Since it did come to be, it must have a cause. And if a God existed, then like everything else which is caused, evil would be traced back to him as its first cause.

But every cause, insofar as it is effective, makes its effect like itself. This is a law which is apparent not only in inanimate nature (e.g., in the phenomena which proceed according to the law of inertia), but also in animate nature (where a lion produces lions, and a human being human beings). And again, it appears in works of art, which resemble the image that precedes them in the mind of the artist.

Now since God is supposed to be the creator of all that exists, everything, insofar as it shares in existence, must be like him; and therefore evil must be, too--which, however, is not compatible with the pure and absolute perfection of God. Evil stands to good in the relation of a negative to a positive quantity; so that just as the existence of good is preferable to the non-existence of good and evil, so the non-existence of good and evil is preferable to the existence of evil. Such a relationship, in terms of positive and negative quantities, seems to be inconsistent with the idea that God has created something evil qua evil.

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* *Du* sprichst: „Es muß die Welt die beste sein:
Das Beste wählt der Beste, wenn er schafft."
Ein *andrer*: „Nicht die beste ist sie, nein!
Sonst wäre sie das Maß von Gottes Kraft."
Doch hört ihr beiden, die ihr also streitet!
Ist denn die Welt? -- Nein! *werdend* überschreitet
Sie jedes Guten Maß, und, endlos fern,
Strebt sie von Ähnlichkeit zu Ähnlichkeit
Zum unerreichbar hohen Bild des Herrn.

Reply: The principle of the similarity of cause and effect, upon which this objection rests, has not been proved. It is justifiable neither *a priori* nor *a posteriori*. Concerning the requirements of an *a posteriori* proof, according to the rules of logic it would not be sufficient to invoke the rule (if it were really valid), of *inductio per enumerationem simplicem, ubi non reperitur instantia contraria* [induction by simple enumeration, where no contrary instances are discovered]. But this rule is not valid, and of course especially not in the cases where causation underlies the observation. Premisses and then the conclusion, presentation and then the principle evident upon the basis thereof, willing the goal and then choosing the means, the idea of "good" and "better" and then the "love" and "preference" which spring apodictically from this idea--these all stand to one another in the relation of cause and effect. But one cannot say that they are similar to one another. In addition, the similarity when it does appear is not always of the same degree. Thus the circular motion continues on tangentially, according to the law of inertia. The self-perpetuating motion changes with regard to place, while the self-perpetuating rest exhibits a greater agreement of the cause with the effect. The supposed law of the similarity of cause and effect is even less valid in the biological sphere than it is in mechanics. Of course, a bird brings forth a bird and a lion lions, but the history of evolution exhibits the genesis of one species out of another. Also, the female bee produces females when she is fertilized by a drone, but when she is unfertilized she produces drones, which are not as much like her. Finally, as far as the similarity between the artist and the work of art is concerned, it is entirely different from the similarity between the organism which is produced and the one which produces it.

62. *5th Argument*: There is a fifth argument which relies on the regularity in the course of nature, and is thus in a certain sense opposed to the previous two arguments which made much of the disorder in the world. Certainly, without regularity there would be no knowledge and no provision for the future on the part of human beings. So regularity constitutes the basis of every undertaking; but it also seems to be incompatible with the assumption that there is an omnipotent God. This assumption would lead us, on the contrary, to expect continual, arbitrary interventions in the course of nature, and that would ruin all regularity and thereby all possibility of human foresight. It has been emphatically

stated that atheism is in the interest of science, and that the assumption there is a God is incompatible with investigation into the laws of nature.

Reply: a) None of the great theists of ancient or of more recent times ever drew such a conclusion. We find nothing like it in Aristotle nor in Descartes, Locke, Leibniz, Kant. For they thought of God as being not only free and powerful but also wise. Just how unwise such a procedure of arbitrary intervention would be is shown by the consequence it would have; which is why it has already been said that this objection appears to be in a certain sense opposed to the previous ones. The truth in them serves to refute this one.

b) This is so obvious that not only the great theistic thinkers but also the more progressive religions reject the conclusion of this argument. This is particularly true of Christianity. (Unless one regards it as the caricature which survives in the superstitious minds of the half-educated or uneducated people who exist, unfortunately, in all walks of life. But that would be to do it an injustice.)

I would say that even popular Christianity, although it affirms the possibility and reality of individual miracles, is far from holding that it is compatible with the wisdom of God for him to overthrow the entire natural order of things and make it unknowable by means of continual and arbitrarily lawless interventions. Popular Christianity sees both in the natural order and in miracles a revelation of God. But neither would be a revelation in the event of such interventions--not the natural order, because it would be destroyed; and not miracles, because there would be no standard in terms of which to appreciate them and to determine that they are deviations from what is usual.

Objection: Someone might say: "Alright, if there were a God, then in any case miracles would be expected. But none occur. At least I have not experienced any in my life; and those which are reported from time to time don't strike me as being very believable. But they would have to happen frequently, and no doubt everyone would have to encounter several miracles in his lifetime."

Reply: I must dismiss this, too, as being an entirely unjustified conclusion. If there is a God, then it follows from this neither that everything is miraculous nor that many miracles, or even one, must occur. Many theists have believed it possible to demonstrate, on the basis of teleological considerations, that it is impossible *a priori* for there to be any miracles or, in general, any direct intervention by God in the course of natural events. That might be too risky a conclusion, and the reasons for it seem insufficiently assured, so that none of the great theistic thinkers we've named would have gone along with it. But none of them, even the most outstanding, ever hesitated to regard it as a cosmological law that it would be contrary to the wisdom of divine Providence ever to bring about something by means of a direct influence when the same thing could be realized by means of secondary causes, that is, by means of powers already existing in the world. If someone inquiring into these matters appeals directly to God to explain them then, as they say, he has invoked the *Deus ex machina*. Aristotle accused Anaxagoras of this, and Descartes judged similarly of Pascal, and Leibniz of Newton.

In view of this it will be impossible to judge whether even just one direct influence of God in the course of nature is required by the theistic view, unless one were to possess considerable knowledge of the purpose and design of the universe. From the fact that no such influence is to be noticed it cannot be inferred that God does not exist.

63. *6th Argument*: As an infinitely perfect being, God would be thought of as acting without being acted upon, which is contrary to the law of the equality of action and reaction. This law was first established in mechanics, but was then extended to all areas of knowledge to the degree that they were open to precise inquiry.

Reply: a) Has this "law of the equality of action and reaction" really been strictly proved to hold universally? Many will hesitate to concede this. The argument even says, "to the degree that they were open to precise inquiry." All areas of knowledge are not thus open to the same degree; hence induction leaves something to be desired.

The lack of precision is especially noticeable with reference to the area of psychology.

One view very widely accepted by natural scientists is that a physiological process is the substratum for a psychological one. Consciousness supervenes on certain processes in the brain, so to speak, as a *παρέργον*, as a surplus with no corresponding surplus on the other side.

The spiritualists see the matter differently. They imagine every conscious occurrence as something passively accepted, an effect of a physical influence on the soul. And on the other hand they see physical events (e.g., the movement of a limb at will) as caused by psychic influence. Here it would be plausible that there is constant interaction, though perhaps it is not strictly proved. But would there also be an equality of action and reaction?

b) What does this so-called law state? It states that action and reaction stand in proportion to one another relative to the masses of the objects involved. When, for example, two bodies attract each other, and one of them has twice as great a mass as the other, then the one attracts with a force twice as strong as that with which it is attracted. But obviously this version of the law can be extended only to physical objects and not to the interaction of spiritual things among themselves, nor to that among spiritual and physical things.

At best one can attempt to draw some analogy here. The inductive argument is converted, by such a μετάβασις εις αλλο γένος into an argument by analogy; but then it loses so much of its strength in this conversion that it can no longer offer a sure foothold.

And what shall the analogy be? The proportion of reality and perfection of existence? How is this to be computed when the infinite acts on the finite? If the one action is finite, then the other must be $1/\infty$, or rather it must be equal to zero (since $1/\infty$ is impossible). So the reverse follows *a priori*: one can prove by the law of equality of action and reaction that an infinite action will find no finite reaction, and hence none at all.

Rather, it would be the reaction not even of a finite thing, but of nothing at all, since God is the universal, total, creative cause.

64. *7th Argument*: We think of God as being an eternal,creative mind, a mind which is itself without a cause and free from every restriction, and which first made possible the whole of nature and the universe. But such a mind is unacceptable. Every thought is the reverse side of a physiological phenomenon, it has as its basis a psycho-physical movement. A thought, however simple it may seem to be, is thus actually something very complicated, or, to speak more precisely, it is something which presupposes very complicated relations. And so we must also think of the divine thought as being accompanied by a psycho-physical movement, and as being the result or the reverse side of the most perfect organization. The basis of the divine thought must be, not any human brain, but somehow the entire order of the universe, just as the pantheists did in fact consider God to be the order of the universe. But they did so in contradiction to the concept of God; for perhaps the order of the universe could be considered to be somehow the purpose of its parts, but it surely cannot be considered their active cause. The order results from the parts, and scarcely has the power to be that in which everything originates. This order is the most complicated of all complicated things. But God is supposed to be simple.

Reply: This objection is taken very seriously by a great number of people. However, it is nothing but a crude anthropomorphism. Of course, we do create out of our inner experience the concept of mind, which we use in constructing the concept of God. But insofar as we carry over this concept of mind in a hypothetical explanation of the first cause of the universe, we don't use in our hypothesis each and every element that we find associated with 'mind' in the particular experience which affords us the concept of it, but rather only such elements as have a suitable explanatory value. We could abstract from the other elements of it, if it were analytically evident that a mind could not be thought of without them. But this is by no means evident with respect to the dependence upon physical processes, which is rather simply an empirical fact.

Aristotle proposed essentially the same difficulty: To think is passively to accept some external impression, by means of which the ability to think becomes a real thought. So how can the first cause of the universe be a thought?

And he answered it as follows: The first cause of the universe is not the same kind of mind as ours, rather it is something inexpressibly higher. It is a mind which is independently active, which is not an ability to think that must first be brought to actuality, but which is by its own nature actual thought.

Besides, this seventh argument, as we have stated it, and as it is often put, also suffers from a certain lack of clarity and precision. The psychological process is designated the "reverse side" of the physiological process. This indicates a correlate relation, something like concave-convex, which simply does not hold for the relation between consciousness and cerebral activity. For this relation, so far from being an analytical unity of genuinely correlate concepts, is rather a very obscure relation which we'd do better to indicate with general expressions like "dependence," if not "interaction," as we have done upon occasion above. The argument could then be just as thoroughly investigated in this more precise version; but it is not worthwhile to press this point here. The decisive mistake of the argument occurs at another point, with the anthropomorphic move by which it is overlooked that the divine thinking is as such transcendent and necessary in itself.

II. ARGUMENTS THE PURPOSE OF WHICH IS TO SHOW *A priori* THAT A CERTAIN PROOF OF THE EXISTENCE OF GOD CANNOT BE PRODUCED

65. We can divide these arguments into two classes: One includes those which are general in scope, the other those which are specifically adapted to our subject matter.

A. SKEPTICAL RESERVATIONS OF A GENERAL NATURE

1. Universal Skepticism

For general and pervasive reasons absolute skepticism, above all, would protest against the attempt to prove God's existence. But it is questionable whether we need to take this point of view into account.

a) Common sense rejects this view; there could hardly be one among you who is inclined toward it.

b) Also, it is equally opposed to all attempts to prove anything. It would be inconvenient to consider such skepticism in all cases, so why should we do so here?

Nevertheless it might be advisable to dwell somewhat on a metaphysical question--the more so since it is the chief question of metaphysics--because the task does fall to metaphysics to distinguish itself from skepticism. And if few are led astray by it, then a few words will suffice.

a) *Absolute* skepticism is *false.* In fact, there are perfectly certain judgments. Every inner perception and every axiom provides an example.

b) Absolute skepticism is *inconsistent.* It would have to reject itself. If nothing is knowable, then neither is the "truth" of skepticism itself. To maintain it despite this is to refute oneself. The only means of defending oneself against contradiction, then, would be to say nothing at all and "to behave like a plant" (Aristotle).

2. *The Mitigated Skepticism of the New Academy*

66. There is yet another standpoint of general doubt, from which one could oppose our undertaking. It is that of a milder skepticism which was advocated in antiquity by the New Academy in opposition to *Pyrrhonism.* According to this view, nothing beyond *probability* is to be achieved.

Here, too, it could appear questionable whether we would really do well to take this view into account. It conflicts less with common sense, and for that reason it is professed today by many a layman and many a philosopher. But by the same token, people generally would be entirely satisfied if we used such a proof in our case, too (supposing the view is correct and only proofs of probability are ever really attainable). They'd be as well satisfied as they ever are when only human proofs are possible.

a) But nevertheless, it is of some little interest whether we really must resign ourselves from the outset and be content with a finite probability.

b) And this inquiry becomes more important still because it is fairly obvious that if one could hope only for probability in all cases, then one could only hope for a very small probability in ours.

A few words will suffice to clarify this.

Early in the history of philosophy an argument for the existence of God was already connected to *the fact that a thing comes to be.* It is maintained that this coming to be has a cause; that this latter, if it has come to be, presupposes a further cause, and that we must assume there is such a series of causes This series--however long we think it continues--leads finally, in any case, to a first uncaused cause to which we cannot then deny the attribute "eternal" and other divine attributes, as is further explained.

I do not want to inquire here whether this proof is afflicted with some peculiar fault; but even assuming that it is otherwise faultless, if we regarded it from the standpoint of that mitigated skepticism, then it would lose nearly every preponderance of probability.

a) The very fact that something comes to be would be only probable.

b) And likewise the assumption that this coming to be requires a cause.

c) But the same would hold again for the coming to be of this cause itself, and so on.

d) We would have to multiply the ratios of probability, and with the lengthening of the series this would lead to a steady decline in the assurance that not even once has something come to be without a cause. Thereby all the rest of the argument would lose its logical coherence.

The result would be quite similar for every other attempt to prove the existence of the original, divine principle of the universe on the basis of the facts of experience. From the point of view also of mitigated universal skepticism, then, it appears that even every merely probable proof of God's existence is done for.

67. But it is also easy to show that mitigated skepticism is false, and that if it is carried out consistently it *destroys itself* and reverts to absolute skepticism.

a) One can call attention to indubitably evident truths, like the principle of non-contradiction.

b) And one can ask whether it cannot at least be regarded as certain that something is probable. If there is only one chance in six that the next roll of the die will be a one, is the judgment which expresses this degree of probability also merely probable? That is, isn't even the fact of this probability assured? Anyone who denies all certainty will also be able to allow only that this is probable, and so on *ad infinitum*. Thus there would result an infinite series of ratios of probability to be multiplied together, and with this every advantage of probability would be wiped out forthwith.

c) The knowledge that something is probable is never direct. Laplace says that every judgment of probability states a compound of knowledge and ignorance. And Augustine remarked that truth provides the standard of probability.

3. The Limited Skepticism of David Hume

68. The opposition which David Hume raised in his day against the possibility of a proof of God's existence is incomparably more important than that raised on grounds of a universally skeptical point of view. It is also especially significant because by means of it, and of the influence it gained over Kant, a revolution was brought about in the common opinion of philosophers. Before him Descartes, Malebranche, Spinoza, Leibniz, as well as Bacon, Locke, Berkeley, and indeed even Voltaire, were all one in the conviction of God's existence. But suddenly with Hume an opposing movement acquired power.

Hume is a skeptic, but not a universal skeptic. He recognizes axioms such as the principle of non-contradiction, and he reckons among them all the basic principles of mathematics and all the rules of syllogistic reasoning. Likewise he recognizes evident perceptions, and doesn't really disapprove of the trust which memory requires.

He is a skeptic only on one point, which is of very general importance, to be sure: He is skeptical regarding the inference to any fact which we do not experience directly. And therefore, of course,--but also for specific reasons which further his case--he holds that every inference to a transcendental fact (like the existence of God) is unreasonable and logically inadmissible.

What follows is the essential thrust of his ideas:

Aside from the facts of which we have direct knowledge, we tend to assume there are others because we infer them. When do we do this, and by what do we believe ourselves justified in doing this?

We rely on causal relations, by virtue of which other facts are connected to the ones that are already known as their causes or effects. So it all comes down to whether we proceed in a logically correct manner here.

a) Above all it appears necessary to clarify the *concept of cause*. From what impression is it acquired? The question poses a predicament from which Hume could only extricate himself by assuming that the concept in question is acquired from a multiplicity of impressions together. According to him, a cause is the regular antecedent to which is connected the expectation that its consequent will occur.

b) Is this expectation rational? On what does it rest? On our previous experiences. Let us see if this conclusion is justified. According to the rules of logic, it is justified if the premisses require it, i.e., if they involve it. It may *not* say *more* than what is included in the premisses. But obviously it does say more, and appears therefore to be incorrect.

c) "But," someone might say in support of the conclusion, "all people infer like this, and experience confirms their conclusions."

"Experience confirms them?" Hume interjects; "What confirms experience? That one may trust experience?--an obvious *idem per idem*!" But if all people do in fact infer like this, then that might show that it is natural for them, but not that it is rational. They are guided, not by the voice of reason, but by force of habit, no differently than even the animals are. Causal inference cannot stand up to the judgment of *reason*. Every inference to a fact of experience is logically unjustified. And so every possibility of knowing a law of causation is lost, and all empirical sciences, such as physics among others, become impossible.

But if every inference to a cause or effect seems to be objectionable in this way, then every transcendental inference will be exceptionally so as being not only irrational but also *unnatural*, since experience is lacking and the appropriate habit cannot be formed. And therefore in particular every inference to the existence of God is ruled out.

Thus Hume. We've seen enough to know that we may call him a skeptic.

4. Kant's Transcendental Idealism

69. This skepticism of Hume's had a pervasive effect and gave rise to a powerful movement in philosophy. Kant, especially, was stimulated by it. In his famous *Critique of Pure Reason* he appears to be concerned to save science, in the broadest sense of it, from such attacks. But the acclaim which this work received did nothing to revive trust in the proof of God's existence.

Kant believes it is possible to assure only the knowledge of objects of experience. And he abandons all inferences to transcendental things. This is exactly what must have established the belief that a proof of God's existence is impossible, since the skeptic and his opponent were found to be agreed on this point.

Before we come to a decision about Hume's view, let's see how Kant himself came to impose such limits on knowledge while he was opposing skepticism. This has to do with the peculiar means he employed as a defense against Hume. Hume did admit the direct knowledge of certain facts and, in addition, axioms like the laws of identity and non-contradiction. Nevertheless, he sought to convey the idea that the most important area of investigation, namely the whole of natural science, is impracticable.

Kant, who actually admired Hume's mental prowess, had no doubt that it is impossible to escape this consequence--unless in addition to those axioms, which he called *analytic a priori* knowledge, we were to possess other knowledge which is independent of experience and which would be called *synthetic a priori* knowledge as distinct from the analytic.

In fact, he believed he found examples of such knowledge in himself. He cites the mathematical axioms, e.g., the geometrical principle that the shortest distance between two points is a straight line. Hume accepted this principle, but regarded it as analytic. Kant found that he had made a mistake in this. The proposition, "The straight line is straight," or "The straight line is a line," is indeed analytic, because the predicate is included in the subject. But this is not the case in the proposition, "The straight line is the shortest line between two points."

Kant thought he found such synthetic *a priori* knowledge outside of mathematics, too, as, e.g., in the law of causation, or the law that a thing which persists underlies a thing which comes to be, and so on. By broadening the basis of it in this way, he believed he possessed a sufficient foundation for the construction of science.

70. But the newly introduced synthetic *a priori* knowledge seemed odd even to Kant. He found it hard to imagine how it was actually possible. Analytic *a priori* knowledge--e.g., the judgment "a triangle is a figure"--seemed obviously possible to him, for here the predicate is included in the subject and adds nothing new to it. It is only an elucidation and not an extension of knowledge. On the other hand, the predicate of a synthetic judgment adds something absolutely new to the subject, which isn't contained in the subject. So how are we to know *a priori* that it is always found to be connected with it, and that the judgment is correct?

71. When Kant found himself facing this difficulty, an idea came to him which seemed to him to be daring, like the idea Copernicus had, but equally ingenious.

Synthetic *a priori* knowledge, he said to himself, is actually impossible if we presuppose, as has been done until now, that our knowledge must conform to things. Let's assume the reverse! Let's assume that things do as we please and conform to our knowledge--surely then synthetic *a priori* knowledge will turn out to be more than possible. For these synthetic judgments, which are somehow established in us *a priori* by virtue of the peculiar nature of our cognitive faculty, will then become determining laws, too, for the nature of the objects of knowledge.

72. However, you might ask, is this daring assumption of Kant's not downright foolhardy? For where are there objects which conform to our knowledge?

They exist, Kant answers, where there are objects which are products of our cognitive faculty; and he calls attention to the whole realm of our phenomena. They are the products of two factors, one objective and one subjective. The thing-in-itself has an effect on our cognitive faculty, and thus a phenomenon is produced. It is essentially determined and, so to speak, formed by the subjectivity of our cognitive faculty. But for just this reason it is not a precise picture of the thing-in-itself which gives rise to it.

But our cognitive faculty is two-fold: Sensibility, i.e., the faculty of intuition, and understanding, the faculty of judgment and universal concepts.

Sensibility is also two-fold: Outer perception and inner perception.

The faculties of intuition bring the effect of the thing-in-itself under the subjective *a priori* forms of space and time. The understanding then also imprints on it subjective concept-forms, the *a priori* categories: Quantity, Quality, Relation, and Modality, each of which includes a triad of concepts. Thus we get twelve fundamental concepts of the pure understanding. The categories correspond to the factors which logic recognizes in the formation of valid judgments.

Forms of Judgment:	*Types of Judgment:*	*Categories:*
Quantity	Universal	Unity
	Particular	Plurality
	Singualar	Totality
Quality	Affirmative	Reality
	Negative	Negation
	Infinite	Limitation
Relation	Categorical	Of Inherence and Subsistence
	Hypothetical	Of Causality and Dependence
	Disjunctive	Of Community (reciprocity between agent and patient)
Modality	Problematic	Possibility-Impossibility
	Assertoric	Existence-Non-existence
	Apodictic	Necessity-Contingency

Thus all phenomena, i.e., all objects of possible experience, conform to our synthetic *a priori* laws of thought. Let us now ask what the situation is with such objects as are not phenomena, not objects of possible experience, but things-in-themselves. Will they also conform to our synthetic *a priori* laws? Kant emphatically denies that they will. And thus he comes to establish a limit to the validity of our synthetic *a priori* knowledge. It applies to what lies within the realm of possible experience, but is not valid for what goes beyond this realm, for what is transcendent.

73. The results of this restriction are easily discerned. Since synthetic *a priori* knowledge is what makes science possible in the first place, there

can only be scientific knowledge of the objects for which it is valid. Therefore all our science is limited to objects of possible experience. Mathematics and natural science are saved but, of course, as sciences not of things-in-themselves but of our phenomena. The knowledge of a transcendent being, especially the knowledge of God's existence--in this he concedes Hume is right--is completely out of the question. Just as the ontological argument was objectionable, so are all arguments which would conclude that the cause of the universe is God. For the *a priori* principle of causality loses its applicability here in the case of a transcendental question.

So this, very briefly, is the way Kant responds to Hume's skepticism. We can see that if we made his famous doctrine our own, nothing would be changed in the least as far as our case is concerned. Whether we follow Hume or Kant, the existence of God appears to be equally unprovable.

Critique of Kant's Doctrine

74. The attack by Kant on Humean skepticism is of no help to us in our position. The synthetic *a priori* cognitions, with which he means to save science in general, have no strength and validity for our question, as he himself admits. And even if he hadn't thus limited the applicability of synthetic *a priori* cognitions, this still wouldn't help us at all, because the entire route which Kant takes in order to escape Hume's doubts is a mistake. Synthetic *a priori* knowledge, confident as Kant was that he possessed it, simply is not to be found at all among the kinds of knowledge that we have.

Those who have heard my lectures on "Practical Philosophy" will not be surprised at this declaration. But it may sound strange to many others. No synthetic *a priori* knowledge? What would become, then, of the whole *Critique of Pure Reason*, on account of which Kant is called the Aristotle of modern times, the new founder of philosophy, the reformer of its content and method, whose work is regarded as the essential turning point in the history of philosophy? One would think it would all come to nothing. For the fundamental question of his entire philosophy is this: "How are synthetic *a priori* cognitions possible?" I confess I am at a loss as to quite how I should respond here. Not that I don't know what would be in keeping with the truth of the matter, but that I don't know how to make the truth sufficiently plausible to you in the short time available. You are young people, who are all the more naturally impressed by the accepted, popular opinion since you have not had a chance to acquire an opposing view through long years of independent study. Also, you've not only heard the glory of Kant heralded in the journals, but you find, too, that Albert Lange celebrates him above all others, and that great natural scientists like Helmholtz pay homage to him. You can read his name, along with those of other great men, on the walls of our university. You've surely opened his chief work at least once, perhaps with the consciousness that you didn't understand much of it, but then you closed it again with that much greater respect. What kind of an impression will it make on you, at first, if I say what others have also known as well as I do but have usually been afraid to say? Kant was not the great reformer. He did not introduce a valid and genuinely fruitful method to philosophy, but rather one which led him and others to the most unjustified fabrications. He was a very imperfect observer in psychology. With his imaginary categorical imperative he could not even gain entrance to ethical inquiry. Misunderstanding the purpose of logic, he restricted it to so-called formal logic, and thus left it in such a rudimentary form that it was useless in its most essential function. Even in the *Critique of Pure Reason* he erected an edifice which, so far from being well-founded, actually rests on a presupposition which is itself an illusion.

This famous work is also not lacking in contradictions and vagueness in matters of detail. Actually Kant was not outstandingly clear; Hume decidedly surpassed him in this.

75. Although not as clear as Hume, Kant was as powerful an influence, indeed a more powerful one. He carried his whole time, his whole century, with him. And thus he marked an epoch in a way that hardly anyone else has done, by which I do not mean to say that the philosophical epoch introduced by him was one of genuine progress.

There are, Lewes tells us, powerful writers and truthful writers. If we accept this distinction, then Kant is to be numbered among the former rather than the latter. Surely the same must be said for Hegel, whom Lewes had in mind when he made his distinction. To be sure, Schopenhauer did not hesitate to call him an impudent scribbler of nonsense. I do not wish to be so impolite, so I shall call him a grand painter of absurdity, an inspired architect of scientific fantasy. For though the entire Hegelian system is mistaken both in content and method, still he certainly expended, and lavished, a superior power in constructing it. A few decades ago the world was still astonished and indignant at such an assessment of Hegel. Today it is clear that his views are scientifically untenable, and a much more disparaging judgment of him is common. This is still not the case with Kant; but the fact that public opinion could be so greatly mistaken concerning Hegel means that a rebellion in the case of Kant need no longer appear to be an obvious overestimation of one's own judgment. Such a rebellion is absolutely necessary today, and especially in philosophy. Our time is not ripe for rational belief.[10]

But I would like to call attention to two other historical facts concerning the authority of received opinion, which may serve to make it appear still more suspect.

76. The followers of Kant make no bones about seeing in him the Aristotle of modern times. But an unbiased look at history shows him in quite another light. Neither what follows him, nor what precedes him, nor what he himself teaches puts him in anything like the place which was occupied by the great Stagirite in ancient times.

a) Herbart says that Kant did ignite a spark which could have kindled a torch, but his legacy fell into the hands of a declining race. He thus admits--obviously with reference to the system builders, Fichte, Schelling, and Hegel--that directly after Kant everything got completely out of hand. Is this believable, if Kant was really the discoverer of the right method and principles? Where in history could there be another example of this? It must be noted, that is, that those who followed him connected their work with his, and did not at all misunderstand and wander away from him. So whence this sudden, reeling decline? It would appear that Kant's philosophy opened a Pandora's box.

b) Kant's place in the whole of modern philosophy is even more clearly characterized by the phenomena which preceded him. This is especially so if one notices certain analogies to the three great periods in the history of philosophy, which are exhibited by the periods into which ancient philosophy is divisible.

History shows us in antiquity, in the middle ages, and in modern times that every period of progressive development is followed by one of decline. Philosophy thus appears to be more closely related to the fine arts than to other sciences, because of this alternation of ascent and descent. This decline is universal and follows a known law. It sets in with an abatement or dimming of scientific interest, whereby philosophy is leveled off and loses the character of rigorous inquiry. Philosophy becomes a kind of scholastic belief in authority, or else a superficial popular philosophy, which constitutes the *first* stage of decline. This change sooner or later provokes the distrust of the more independent thinkers. And--just as in politics the rule of lawless despotism leads to an anarchy which is against all forms of civil order--this change in philosophy unleashes a skeptical reaction, which shakes all the rational foundations of our convictions--the *second* stage of decline. But skepticism cannot satisfy mankind. People have a natural drive to know things, and after the skeptical famine this increases to a pathological craving. There begins a reaction to skepticism, a reaction which transgresses all bounds of moderation. The boldest assertions appear abruptly on the scene, with little or no connection to any orderly thought process. People dare to soar toward the most inaccessible heights, indeed they think they've already reached them, yet in truth the greatest gaps in their knowledge are filled with the most arbitrary assumptions. Thus the *third* and final stage of decline is reached. The contrast to the modest but healthy beginnings of philosophy is most pronounced. People believe they know everything, but they know nothing. For they do not even know the one thing which, at the beginning, they knew and felt with a painful longing--namely, that they knew nothing.

77. In antiquity philosophy achieved its pinnacle in Greece with Aristotle. Soon after him its course descended, and philosophy deteriorated more and more obviously, primarily because practical interests began to dominate the love of knowledge for its own sake. The whole of Greek culture was in a condition of disintegration at that time. Religious belief was a thing of the past, and the authority of the traditional civil institutions was broken. So philosophy was called upon for help in time of need. The Stoics and the Epicureans, with their one-sided practicality, were the two schools of thought to represent the first stage of decline in antiquity.

In the middle ages, directly after the great Christian teacher, Thomas Aquinas, there appeared an analogous stage of decline in the time of the scholastic disputes between the Dominicans and the Franciscans. The authority of the great teachers of these orders, Thomas and Duns Scotus, regulated inquiry so that every Dominican swore allegiance to the former, and every Franciscan to the latter. Dogmatism took the place of truth, endless disputation and monstrous distinctions took the place of fruitful inquiry.

In modern times, under the name, "Philosophy of the Enlightenment," the popular philosophy of England, France and Germany trivialized and watered down the great achievements of the real champions of scientific progress, Descartes, Locke, and Leibniz. And each time the new development has led to skepticism. In antiquity there was Pyrrhonism, and the less consistent, more moderate skepticism of the new Academy and the Eclectics. In the middle ages there was Nominalism, and in modern times the epistemology of Hume, which we've already examined somewhat closely. Each of these uprooted and shook the natural foundations of knowledge, and led in the end to an extreme reaction, whether mystical excesses or the uncontrolled delight in system building. Thus there were in antiquity the Neoplatonists and the Neopythagoreans; in the middle ages the mysticism of Meister Eckhardt, Johannes Tauler, Heinrich Suso, the artificial machinations of Lulli, and the "speculation" and "intuition" of Nikolaus Cusanus who boldly presumed, with his "*docta ignorantia,*" to transcend all experience and all the paths of common logic.

What began in Germany with Kant, and dominated the scene until the demise of Hegelianism, is essentially analogous to the corresponding *fourth* phase of the two previous periods in the history of philosophy. It is a substitute for philosophy which sets in as a reaction to skepticism, and has the tendency to add new means of gaining knowledge to those which skepticism objects to or deprives of their former significance.

78. Among these substitute means of gaining knowledge, many are introduced with the promise of being superior to the natural ways of knowing by perception, deduction, and induction. Thus the ecstasies and supernatural revelations of the Neoplatonists, the "*docta ignorantia*" of Cusanus, and the Lullian art inspired by the Holy Ghost. If you think about it, the disdain which the German idealistic philosophers after Kant showed for "common experience," and the "intellectual intuition" of Schelling which is supposed to be given to geniuses but can't be taught to anyone else, are both rapturous substitutes for ordinary ways of knowing.

Other, more modest substitutes are the surrogates used by the leader of the anti-skeptical movement in England, Thomas Reid. One could call them stopgap measures, in place of genuine knowledge, for they are obviously not to be ranked as highly. Instead of appealing to evident principles, the so-called Philosophy of Common Sense appeals to blind, instinctive judgments, which are by nature common to all men and which we have to rely upon, although unlike strictly evident judgments they can deceive us. In addition to these natural judgmental inclinations of common sense, there are also dictates of the will which influence our convictions.

Both kinds of stopgap measures were then employed by Kant, and he offered them as means of defense against skepticism. The natural, judgmental inclinations became his synthetic *a priori* cognitions; and the dictates of the will became his postulates of practical reason.

79. These general observations could hardly have been dispensed with, in order to make my rejection of Kant's doctrine, and of his attempt to respond to Humean skepticism, seem less paradoxical to you. In order to justify it completely, let us now return to the critique of his doctrine of synthetic *a priori* knowledge and of his attempt, which is based upon it, to save science in the face of Hume's attack.

I presented to you the presuppositions which led to the conviction that all new knowledge of universal and necessary laws is to be gained only by synthetic *a priori* propositions. If the presuppositions should prove to be mistaken, then the entire foundation of the *Critique of Pure Reason* would dwindle away with them. We also became acquainted with his doctrine of the *a priori* intuitions and universal concepts, which we are supposed to possess independently of the intervention of things in themselves. Finally, we heard of the limits which he sets on knowledge. No thing in itself is supposed to be knowable, only phenomenal truth can be achieved. And we cannot make inferences to any transcendental facts, that is, to what cannot be an object of possible experience.

This whole doctrine is untenable from its very foundation.

There are no synthetic *a priori* cognitions in the whole sphere of human knowledge. No one ever found one, and if Kant himself believed that he had found them, it could only be because he did not have clear concepts of "knowledge" and "synthetic," and did not know their essential characteristics.

80. This is especially true of the concept of ***knowledge***. Knowledge involves not only truth but also ***insight***. Kant seems to have overlooked this entirely. If one bears this in mind, and then considers Kant's statements on the subject, then it is immediately apparent that Kant himself never believed he had found a judgment in which there exist united the elements which would belong to a synthetic *a priori* cognition. Four elements of Kant's exposition are indicative of this.

a) His *question*: "How are synthetic *a priori* cognitions possible?" What does he mean? To determine--to deduce from the nature of the soul--how we human beings acquire these intellectual accoutrements? That can't be it, because then the same question would have to be raised with regard to analytic judgments, indeed with regard to judgments in general. All such questions would be impossible to answer and equally misguided. To put it precisely, the sense of his question must rather be: How is it possible that we make certain synthetic judgments before the fact and with total conviction, although without genuine insight? And how is it that these prejudices somehow prove to be correct, even though one would think that experience would contradict them sooner or later?

According to Kant, analytic knowledge is obviously possible, since the predicate is contained in the subject and must be connectible with it. A synthetic judgment, on the other hand, joins to the subject a predicate which is not contained therein. How are we supposed to know *a priori* that the predicate in this case is always connected with the subject, and that the resulting universal judgment is correct?

We cannot ***know*** it; this is what Kant wishes to deny. And yet in such cases we judge with total conviction, and our judgments are borne out. *That* is what's so surprising.

But please notice: the occasion for Kant's surprise is precisely the fact that these judgments are not directly evident to us. He regards them as *a priori*, but he doesn't mind admitting that they do not *become evident* to us *a priori*.

b) The second element of Kant's exposition, which gives us to know that he couldn't possibly have been in possession of the true concept of knowledge, is his *answer* to the foregoing question. He says that things conform to the judgments which are established in us *a priori*. This answer is completely inadequate, for if things really behaved that way, then our judgments could easily be free of error. But the question, how we come to know that we are not making a mistake, remains unanswered, precisely because the evidence is lacking.

c) The third element: Kant finds it necessary to inquire whether this new class of cognitions has limited validity and what the limits are. Thus there is obviously still no *guarantee* of truth.

d) The fourth element: His answer to this question. In fact, he does impose such a limitation of validity. So synthetic *a priori* cognitions actually lack *truth* itself.

81. Thus, in light of the presentation and treatment which they get from Kant himself, these appear to be not synthetic cognitions at all, but rather synthetic *prejudices* (*a priori*), and he just assumes that phenomena conform to them. And so what Kant puts forth under the name, synthetic *a priori* knowledge, is nothing at all but blind prejudice. There are genuinely evident truths among these cognitions, which become evident to us directly from experience. But even they do not offer us any example of synthetic *a priori* knowledge. They are missing another characteristic which they would need in order to qualify: they are not really *synthetic*, rather, they are analytic *a priori* judgments.

That is to say, just as Kant failed to understand the concept of knowledge, he also failed to understand the concepts of "*analytic*" and "*synthetic*." Above all it must be objected that in defining the analytic he made allowance exclusively for categorical propositions (he speaks of a predicate that must be contained in the subject, but only categorical propositions have a subject and a predicate). However, sometimes conditional, disjunctive, and existential propositions[11] also become evident analytically. Furthermore, Kant overlooked the fact that the proposition, "A is A," taken as the expression of an affirmative judgment, is not evident *a priori* at all, even though its subject contains its predicate. The appropriate definition, which would take into account all these considerations, would rather be the following: A judgment is analytic which becomes evident upon consideration of the concept involved (becomes evident *ex terminus*). Such judgments are always negative, apodictic judgments, and indeed what they deny is the conjunction of contradictory or incompatible characteristics.

Kant's mistake in this connection invites the danger that one will fail to recognize the analytic character of many judgments, and thus underestimate the significance of the entire class. In fact, this is what Kant does when he says that our knowledge is not expanded by means of analytic judgments. But actually, in as much as zero plus one is obviously greater than zero, his opinion in this regard appears to be downright contradictory, and can only be explained by the fact that he confused the expansion of our knowledge with the expansion of our ideas. One who has an idea of A, without knowing whether or not A exists, has no knowledge of A because he makes no judgment concerning it. But surely one has gained knowledge, as soon as one knows something about A, and there is no need on that account also to have acquired ideas in addition to the idea of A.

82. It also strikes me as strange that Kant thinks it right to contrast elucidation with expansion. Isn't an elucidation something that expands our knowledge? Certainly! And often elucidations are very difficult to acquire. Otherwise how could definitions be investigated, and how could we learn from them? And how could it be so often the case that in trying to construct a definition one fails to achieve one's goal? Is psychognosy, the characteristic task of which consists in clarifying what inner perception reveals to us, supposed not to result in any expansion of our knowledge? Is Helmholtz's analysis of sound not a discovery of new truth?

But all cases of explanation aside, the simplest statement of the law of non-contradiction, "No A is not-A," is an integral part of our knowledge. If we did not know it, we would be poorer in knowledge; consequently it does enrich and expand our knowledge.

In addition to forms of the law of non-contradiction, other analytic propositions express positive incompatibilities, and where these are concerned there is not even the misleading appearance that they do not offer us something new in the way of knowledge.

Kant did not notice that prepositions expressing positive incompatibilities are analytic; and he failed to recognize the significance of analytic propositions like the forms of the law of non-contradiction. The result was an even greater inclination to restrict the realm of analytic knowledge. Whenever a non-trivial conclusion is drawn, the relevant judgment is not analytic, according to Kant; and so no science can be built up out of analytic propositions.

83. He actually denied the analytic character of mathematics, though even Hume had left that untouched. Not even the proposition, $1 + 1 = 2$ is supposed to analytically evident.

It is only to be wondered why he judged quite differently concerning logic. This he regards as analytic throughout. Obviously he forgot that analytic judgments are never supposed to bring about an expansion of our knowledge.

Albert Lange suggests a correction here: Logic is in fact synthetic, because its fundamental laws result from the intuition of space, since we illustrate the relations among the ranges of concepts by the use of intersecting circles, and so forth. The intuition of space is itself *a priori*. But Lange's effort is wasted; syllogisms are demonstrably analytic. Anyone who denies the conclusion of a valid syllogism will contradict himself if he accepts the premises.

Therefore all mathematical knowledge, too, is analytic.

This is true, above all, of arithmetic.

Kant tries to establish the synthetic character of arithmetic by making use of the proposition 7 + 5 = 12, as an explanatory example. In his opinion, 7 + 5, includes only the uniting of these two numbers, to think of which is not at all to think of the number in which the uniting results. One must resort to an intuition by which, for example, one counts with one's fingers and thus sees the number 12 itself appearing. By analyzing the concept itself, without the aid of intuition, we could not ever find the sum.

However, this argument is lacking much that is needed if it is to succeed.

1. Kant says that one must resort to intuition. Now in a certain sense this is always the case. No elementary concept can be acquired without the corresponding intuition, and thus every analytic judgment presupposes intuitions which are the source of the concepts it analyzes.

But Kant is not speaking here of this relation between intuition and conceptual thought. What he means to say is rather that in the example from arithmetic the specificity of the intuition, as opposed to the general concept, is what is useful.

2. Is that right? No! Wherein does the specificity of the intuition consist? In the individuating factors (or in those that specify the individuation as closely as possible). But the mathematician is not allowed to appeal to these when the proposition to be proved is a universal one. Thus, for example, in the proof of the Pythagorean theorem one cannot appeal to the fact that the one's intuition is of an isosceles triangle when the right triangle drawn on the blackboard happens by chance to have two equal sides. If one did so, then the proof would have no application beyond this small sphere. Only what is common to all right triangles can be made use of, and therefore not what distinguishes an intuition as such from a concept. If an individuating factor is appealed to, then what is achieved will be, not a universal proposition, but a particular one. Frequently, upon repeating the proof for other intuitions, one would arrive, perhaps, at an inductive argument. But Kant himself did not believe that mathematicians proceed in this manner.

3. But even assuming that the specificity of the intuition, as opposed to the concept contained in it, is indeed made use of, how shall we imagine the procedure to take place? Will we acquire the judgment as the result of the intuitive idea? Or as a fact of experience?

Surely not as a fact of experience. I discover as a fact of experience that hydrogen and oxygen together make water. For this very reason mental images do not suffice for knowledge, rather some perceptions are required. In mathematics mental images suffice.

Thus a mathematician would acquire his judgment from intuitive concepts, and to that extent his fundamental knowledge would always be analytic. It would consist in analytic, particular judgments. But these particular judgments would achieve a universal significance because of the fact that (within the world of our mental images) what is particular and individual about an intuition corresponds with the characteristics that constitute the concept of the concept.

The necessity of mathematical truth would then be established only, and entirely, by experience. To that extent, mathematics would be empirically grounded. Beyond this, however, it would appear to be analytic. But according to Kant mathematics is *a priori* and yet not analytic.

4. Let us look in more detail at Kant's procedure with his example.

At issue is the proposition, $5 + 7 = 12$. If the proposition, $5 + 20 = 25$ were under examination then it would be quite apparent, indeed I would say, it would be evident that this proposition constitutes an instance of the principle of non-contradiction. Likewise for the proposition, $2 + 1 = 3$. For $(1 + 1) + 1 = 1 + 1 + 1$. The same holds for $5 + 5 = 10$, and for $5 + 2 = 7$, therefore also for $5 + 7 = 5 + 5 + 2$, and for $5 + 5 + 2 = 10 + 2$. But likewise for $10 + 2 = 12$; therefore also for $5 + 7 = 12$. Therefore even $5 + 7 = 12$ is analytic. What makes it easier to miss the analytic character of this proposition is just that the usual subdivisions of the base ten system are cut across. The sense of it is: a group of 5 and a group of 7, divided into groups which have a place in the base ten system, yield a group of 10 and a group of 2.

I can form an intuitive idea of this division into groups. In the intuition I can grasp the general concept of the division into groups, and I will arrive at the result $10 + 2$ both in the intuition and in the concept, except that the result is more specific in the intuition and less well-defined in the concept. And thus I can gather analytically from the concept of the division into groups that $10 + 2$ is the result of it.

5. In view of this I believe it is easy to see what led Kant astray. The concept of the division of $7 + 5$ into groups belonging to the base ten system may be thought of either strictly or loosely. The concept is strictly thought of if it is taken as a standard. It is loosely thought of if it is taken, so to speak, as a postulate, for example, if I think of "division into groups belonging to the base ten system" by itself, and "with respect to $5 + 7$" by itself. If I think strictly of this division into groups, then I can know directly and analytically what its result will be. If I think loosely of this division, and take it as a postulate, then I cannot know the results directly. Nevertheless, the postulate provides a sufficient basis upon which to proceed, because when I understand the requirement it imposes I can fulfill it. (In some cases this can be done quickly, in others the process

takes longer. Naturally, it can be done quickly for 5 + 20; likewise for 1 + 1; relatively quickly also for 20 + 1; but obviously it takes longer in the case of 7 + 5 = 12. Kant chose this example for that reason, and for that reason also he thought that people would be even more easily convinced by even larger numbers.)

Kant mistakenly thought that the fulfilling of the requirement of such a postulate, by means of actually fulfilling the requirement of the relevant concept, constitutes the addition of intuition to the concept. And this is the source of his opinion that a mathematical judgment adds to a concept factors which are taken, not from the concept, but from an intuition.

84. Likewise, *geometrical* knowledge is also analytic. The axioms of geometry are not merely true, *a priori* insights, but they are also genuine instances of the law of non-contradiction. To be sure, Kant's favorite proposition for demonstrating the alleged synthetic character of geometry, that the shortest distance between two points is a straight line, is not evident to us directly upon consideration of the concepts. But then, it is not really an axiom, but rather a demonstrable theorem, and at that an analytic one. In order to prove it, one appeals to the law that there can be only one straight line between two points, and this law in turn is a result of the following two laws: "Two directions which are equal to a third are equal to each other"; and "Equal directions, altered equally, yield equal directions."[12]

It is instructive to compare with Kant's doctrine what Helmholtz says "On Geometrical Axioms." In an essay under this title he shows the impossibility of basing geometrical axioms on the fact that the intuition of space is *a priori*, and ultimately he admits that they are analytic. He designates as synthetic--and empirical--only the fact that a three-dimensional space really exists, and also such laws as postulate the drawing of a straight line or the tracing of a circle (which actually involves mechanical processes, and not pure quantitative relations). No reasonable person could deny him this claim. Even Hume readily admitted it. It doesn't affect the essentially analytic character of strictly mathematical truths at all. For it concerns operations which we find necessary for the application of mathematics to reality, and which we can actually carry out only very roughly.

85. Therefore both the concept and significance of knowledge, and the concept and significance of analytic judgments, were misunderstood by Kant when he developed his doctrine of synthetic *a priori* knowledge. And if we look at his examples, we can see that those which are really evident are analytic (e.g., the propositions of pure mathematics); and those which are really synthetic are not evident, and thus do not yield *a priori* knowledge. Such, for example, is the law of inertia, concerning which it cannot be said that we have an innate impulse to believe it. Aristotle had

no inkling of this law. And you yourselves have perhaps heard it for the first time, and with amazement, in a physics class.

Of course, Kant uses his customary arguments in connection with the law of inertia and other laws which he also takes to be synthetic *a priori*. At issue, he says, are propositions which admit of universality and necessity. And indeed it is absolutely correct that the law of inertia expresses a universal and necessary truth. But what follows from this? Indeed only that these characters of universality and necessity, when they are met with in a proposition, do not constitute sufficient grounds to give assent to the proposition independently of experience.

It would be more plausible to regard this case as presenting us with a kind of middle ground between an *a priori* and an *a posteriori* assumption. What I mean by this may be made clearer by another kind of example. None of you expects that before we part company the roof of this lecture hall will collapse over our heads; rather you're convinced that it will continue to hold up even after we've left. You hold his faith with perfect confidence. But strictly speaking, only a certain high degree of probability is logically justifiable. Nevertheless, we make the step from this probability to a firm conviction without further ado. This kind of procedure is completely natural to us. It is precisely on this psychological law of judgment formation that the Apologist, Cardinal Newman, rests his justification of the church's doctrine concerning the duty of faith, in his work, *Grammar of Assent*. This doctrine requires, even though the fact of divine revelation can be established only with probability, that one still be as perfectly convinced by it as one is by what is known to be certain. Of course, logic would find this contradictory--but Newman says, so much the worse for logic, since it thereby becomes an enemy of nature.

One could say the same holds for our belief in the law of inertia. As a result of experiences, there arises in our subjectivity an impulse to affirm this synthetic proposition as universal and necessary. And so in a certain sense this would always be a synthetic *a priori* judgment, since experience as such could not guarantee its absolute universality, yet our judgment--though made only after experience--is absolutely universal.

Nevertheless, even if Kant's doctrine is looked at, or rather reconstructed, this way, still our essential reservation about it remains and actually cannot be done away with. That is, if we lay down the law of inertia by the method just indicated, such that a subjective impulse draws us further in our judgment than what experience justifies, then this judgment would really be an unjustified prejudice, and therefore not an example of *a priori* knowledge. It wouldn't be knowledge even if the judgment were correct, nor even if things did conform to our subjective prejudices.

86. But how can this be, one might ask, if we are certain that it does happen? The answer would have to be, perhaps it does, but what is the

source of our certainty? Of course, Kant believed that he possessed such certainty, but that was precisely his peculiar mistake. He seems to hold that it is obvious that our phenomena conform to the subjective laws of our cognitive faculty, because their coming to be depends not only on the thing in itself but also on a subjective factor. If this is really what he thought, then the following objections suggest themselves:

1. This subjectivity is still not the sole factor involved. The thing in itself also takes part in the realization of a phenomenon. And there is no *prima facie* reason to think the one factor is more powerful than the other. Suppose the subjective influence is so great that the thing in itself becomes entirely unknowable and we are not entitled to regard the laws of phenomena as simply coinciding with the laws of things in themselves, in order to infer the latter. In that case the influence of the thing in itself will also be powerful enough to prevent us from affirming rationally that the laws governing phenomenal processes will harmonize precisely with our subjective laws and our subjective prejudices.

2. We find that people make all kinds of judgments which are formed according to a natural method. Indeed, all judging proceeds according to psychological laws, just as physical events proceed according to the laws of nature. But this doesn't mean that the course of real events conforms to psychological laws. Rather, many judgments prove upon closer inspection to be groundless prejudices. Every one of us has them, entire nations fall under their spell, certain epochs make them fashionable. They have all arisen according to the laws of subjectivity, but it doesn't occur to real things that they should conform. Things conform to our customary prejudices no more than to the fixed ideas of a fool, which latter nevertheless do proceed according to the laws of his subjectivity.

Perhaps someone will find this comparison inappropriate, since it has reference to *acquired* prejudices, whereas synthetic *a priori* judgments are innate. But it is with the latter that the course of things is said to be in conformity. But such agreement is neither to be expected *a priori*, nor to be confirmed by experience. Just think of the instinctive faith in outer perception which we hold from birth. We assent without further ado to everything the senses present to us. And yet in the course of experience we have come upon contradictions which destroy the credibility of the senses. Likewise the natural inclination of habit in the sphere of judgment quite often leads us to be deceived. But if all these cases clearly show that phenomena do not conform to our prejudices, what justifies us, then, is assuming unconditionally that in other cases phenomenal events will necessarily proceed in correspondence to our natural prejudices?

3. Indeed, even assuming that pure idealism is right and there are no things in themselves, it still would never be evident that phenomena must

proceed in keeping with our prejudices. Even if, as Leibniz thought, our soul is a monad without windows, incapable of receiving any outside influence, and producing all phenomena in itself according to internal laws, still the sequence of these phenomena, and our expectation concerning this sequence as it develops within us, are two different matters and can be quite divergent.

Thus the agreement which Kant presupposes is by no means obvious, and if it really obtains, still it is questionable how we could know of it. Clearly the only way would be by experience, i.e., by induction, which Kant regarded as unsuited to the acquisition of universal validity. Indeed, like Hume he denied that experience could be the source of knowledge about strictly universal and necessary laws.

But then synthetic *a priori* cognitions also appear to be superfluous and useless. Everything would rest on induction, not on synthetic *a priori* propositions. For how am I to discern, by induction, that facts agree with *a priori* prejudices, if it is not by means of induction that I have established the universal laws themselves? And in any case, he who casts the power of induction in a questionable light offers no assistance against Hume.

Thus Kant's apology for knowledge appears to founder completely. We would not need to dwell on it any further. Nevertheless, it may be advisable, considering the reputation of the philosopher we're attacking, as well as the importance of the questions at hand, to consider another aspect of the theory he put forth in order to understand why Kant's fundamental intuitions are untenable at other points, too.

87. Kant not only speaks of *a priori judgments*, in a way they were not known before, but he also introduces *a priori representations*. Let us take a look at these.

First of all, what does "*a priori*" mean in this case? Clearly it means: independent of the influence of things in themselves, purely subjective.

There are supposed to be both intuitions (which are individual representations, according to Kant),[13] and concepts that fall in the class of *a priori* representations. There are two *a priori* intuitions: space and time. And there are twelve *a priori* concepts: the categories, or fundamental concepts of the understanding, of which three are subsumed under each of the four divisions--quantity, quality, relation and modality.

In my judgment this whole system is the monstrous issue of an arbitrary delight in making constructions together with a relatively poor ability to make psychological observations. Not a word of it holds good.

88. Space and time are supposed to be infinite, *a priori* intuitions, where by "*a priori*" is signified their subjective source and their independence from experience (i.e., from the influence of things in themselves). But has Kant demonstrated this independence? He would

have a proof of it if he could demonstrate that our intuitions of space and time are temporally prior to the influence of external stimuli. But this method of proof fails, and Kant concedes that these intuitions are not prior to experience in this sense.

On the other hand, he does appeal to the fact that they are universal and necessary. They are universal because all phenomena of inner perception appear to us temporally, and all phenomena of outer perception appear to us spatially. They are necessary because we can't imagine anything apart from them. If we imagine that nothing at all exists, still space remains--and likewise time.

This is reminiscent of something we noted earlier. In the case of the alleged synthetic *a priori* judgments, too, we heard Kant propose universality and necessity as criteria of the *a priori*. Here we find these criteria again, and Kant obviously believes them to provide a similarly convincing proof. But in truth all we're presented with is identical terms having different meanings; and if Kant did not notice this, then he was just deceived by an equivocation. In the case of the intuitions of space and time, universality means that they are to be found in all appearances, whether in both realms of perception or only in outer perception. In the case of synthetic knowledge, universality did not likewise mean omnipresence; rather it meant that wherever such knowledge occurs it occurs as a universal law, as a judgment which makes a universal and necessary statement.

Kant didn't notice this equivocation, and therefore he ventured to make similar use in both cases of the criteria of universality and necessity in order to establish *a priori* character. So we should be skeptical of the reliability of his system in general. At the same time, the very change in meaning of the criteria of the *a priori* could serve to recommend the use of them which he makes for the intuitions of space and time, since we've seen that the other sense is entirely inadequate. But from the point of view of logical justification, his procedure in the one case is on a par with the other. The reasons are as follows:

1. How does he arrive at universality? Through induction? Then he would violate his own principles, since induction is not ever supposed to guarantee such universality. But what else assures him that no appearance has escaped his notice, and that the whole future will be like the past in this regard, if induction does not do so? (I do not want to say anything about Helmholtz and the so called empiricists, who are of the opposite opinion, and teach that our idea of space develops gradually out of non-spatial appearances; for I cannot convince myself that they are right about it.)

And how does he arrive at necessity? By noticing that we cannot imagine there being no space? But it seems that he could have established this law, too, only by induction. And even if we can't imagine there being no space, who can say it is not the case that at least when thought is suspended--for example, as the result of a blow to the head--the intuition of space is also suspended? But in that case there would not obtain a necessity entirely free of the influence of things in themselves.

2. However, even if universality and necessity themselves were construed in an unobjectionable way, this would be far from a proof that the intuitions of space and time are *a priori* in the sense of the relevant appearances being independent of the influence of things in themselves. The influence of the thing in itself (at least in the way it acts at the time) could be what makes the appearance persistently necessary. In fact we are temporarily unable to get rid of certain sounds or melodies. And this is even more clearly the case with colored appearances, at least if we include black and white among them. (The sense experience peculiar to the retina is of a dark gray, which appears to us when no external influence operates on it. This is a positive quality, and by no means a privative one.)

Therefore the existence of *a priori* intuitions of space and time, as Kant intends us to understand them, has not been proved.

Moreover, even Kant affirmed the universality and necessity of space only for certain realms of experience, namely for the appearances of outer perception. If he thinks this suffices for his point, then why not restrict the universality and necessity of space to an even narrower sphere, for example, to that of color, or sound, etc.?

90. 3. Again, it is demonstrable that we do not have intuitions of space and time in the Kantian sense, and that those intuitions we do have could not possibly be *a priori* if the ideas of objects that fill space and time--colors, sense impressions, etc.--are *a posteriori*.

a) Above all, our intuitions of space and time are not infinite. On the contrary, they are very limited. The so-called psychological present comprises only fractions of a second, and is the only piece of our idea of time that is really intuitive.[14] Also, each sense field--the visual, auditory, and so on--has narrow boundaries that cannot be transcended. It is a noteworthy sign of primitive psychology that Kant could teach the opposite.

b) Actually space and time are not intuitions in the Kantian sense, according to which the term "intuition" is supposed to mean an individualized idea. We really don't intuit any absolute spatial determinations, nor any absolute temporal determinations. But relative determinations lack individuality, since it is clear that identical distances could be found between different sets of points in absolute space and time.[15]

c) It is not possible to separate qualitative determinations from these relative spatial and temporal determinations. A colored thing, as it is intuited, cannot be experienced except as spatially and temporally determined, at least in this relative way, as Kant himself concedes. Spatiality is included in the qualitative factor, just as the substantial is included in the accidental. But this is precisely to say that the intuitions of space and time could not be *a priori*. To deny this would be like saying that the intensity of a sound is given *a priori*, though the sound itself is given *a posteriori*. This is not to say that we are unable to think of spatial and temporal things abstracted from determinate qualities--but in this case we're obviously dealing with universal concepts, not with intuitions.

91. How does the situation look for universal *a priori* concepts?

Just as bad, or at least, no better.

Kant cites, as "categories" of universal *a priori* concepts, the meanings of the words, 'existence,' 'non-existence,' 'necessity,' 'impossibility,' and 'possibility.' But we don't find any proof that these are really *a priori* concepts. Such a proof never could have succeeded, since it would be an error to take these words for actual names, i.e., for indicative terms, which give expression to concepts and name things. Here we are rather dealing with merely logical expressions, which have meaning only in the context of what is said, as does the small word, 'is,' as well as particles, or conjunctions.

When we were rejecting the ontological argument, it was indicated that one who holds a thing to be existing does not connect the idea of this thing with a second idea, that of existence. Rather he judges affirmatively concerning the thing in question. One who "holds it to be non-existent," rejects it. It also strikes me that one does not make a judgment concerning a particular thing itself, since one completely contains in oneself one's own judgment, whether the thing exists or not. So one has an idea of the thing as being judged of (affirmatively or negatively) by someone. Perhaps, in addition, one thinks of it as correctly affirmed (or rejected) by such a judger. We tend to say, "one imagines that a thing exists (or does not exist)"; or even, "one imagines the existence (or non-existence) of the thing." And so we get the impression that new objects are imagined, distinct from the thing itself, whereas a correct psychological analysis shows that this is not the case at all. No existence, or non-existence, becomes an object; rather what is thought of is one-who-accepts-the-thing, (or one-who-denies-the-thing). And then naturally the thing itself is also thought of indirectly (*modo obliquo*). Thus the words, 'possibility,' 'impossibility,' and 'necessity' do not express any concepts, and do not name any things. One who recognizes that something is impossible rejects it, and at that, with apodictic modality. On the basis of this he naturally can form a concept of one who correctly, apodictically rejects a thing. And if he himself contains such a judgment, then it may be said of him that he directly imagines the thing as being impossible. It can also happen that we think of one who rejects a thing apodictically and with evidence, and yet ourselves apodictically reject this judger, insofar as he judges with evidence--a peculiarly complicated thought, which however we express grammatically quite concisely when we simply say we consider the thing possible. None of this involves *a priori* concepts, since we acquire entirely from inner experience the concept of a judger, and the more particular concepts of an affirmative, negative, apodictic, or evident judger.

92. To be sure, there are also genuine names to be found among Kant's so-called categories. I could hardly deny that the expressions, 'substance' and 'accident' (what substands and what inheres), as well as 'cause' and 'effect' (what acts and what is acted upon), all may name things and signify concepts. But this is not a point in favor of Kant, since it is not hard to demonstrate that these concepts have their source in experience. Regarding the concept of causation, as was indicated earlier it is intuitively contained in our inner experience. We will return to this point in more detail when we explain the way Hume attempted to give an account of this concept. But also regarding the concept of substance, it is a mistake to imagine, as some have, that it is not given in any perception since, on the contrary, it is given in every perception, as Aristotle recognized, being the first to have a clear understanding of this concept.

He understood substance to be the primary subject of real determinations (τό υποκείμενον). And he taught that such determinations always include a substance, such that though there can be a substance existing in itself, there cannot likewise be an accident in the absence of an underlying substance.

In fact, our inner experience exhibits in many ways such relations of one thing inhering in another. For example, one who perceives himself to be one who-judges-with-evidence will find in this evidence an example of something that inheres in the judgment. The thing that substands, on the other hand, the subject or, so to speak, the bearer of the evidence, is the judgment. What we have in such a case is a relation of one-sided inclusion, inasmuch as the one-who-judges-with-evidence includes the one-who-judges. For the judgment is what is evident. One can easily detect a certain analogy between this relation and the relation of genus to species, since a species (red-thing) also includes a genus (colored-thing). However, there is an essential difference insofar as the genus cannot exist apart from some specific determination or other. (It is not possible for there to be a colored-thing which has no determinate color, but is rather colored in general.) But one-who-judges can persist in the absence of evidence and without making a substitution for the evidence. This is what I had in mind when I remarked that what we have in such a case is a relation of one-sided inclusion.

In view of this we could call the evidence an accident that characterizes the judgment. The judger, as such, appears to be the subject of the one-who-judges-with evidence. But we would not, therefore, be entitled to call the judger a substance, since he does not appear to be an ultimate subject. The reason is that one who judges concerning some x includes one who was a presentation (or idea) of x. It is surely conceivable that one have an idea of something without passing judgment on it; but it is not likewise possible that one pass judgment without actually possessing an idea of the object judged about. It thus appears that the one-who-has-an-idea is in turn the subject of the one-who-judges--but even this is not its ultimate subject. For even if we have an idea of one who judges concerning a certain object, and this idea is precisely determined in terms of quality, modality, and evidence of the judgment, still the idea has not yet acquired individual specificity. Rather, there may be innumerable objects corresponding to this idea, that is to say, there could be ever so many individuals judging precisely the same way.

And another consideration likewise leads us to see the requirement that there be something further which underlies both the judger and the one-who-has-an-idea. Experience shows that one who judges can also at the same time love, hate, see, and hear without any of these activities being dependent upon one of the others. Rather, one who ceases to see can continue to hear and to pass a particular judgment, and conversely, after he ceases to judge concerning some *x* he can continue to see, etc. All the same, inner perception here shows us, not a collection of things, but one unified thing which is involved in a variety of mental activities. And this subject which is common to all the psychological activities occurring at a given time is what we regard as an ultimate subject. We can use the term "substance" to refer to this subject without departing from the old Aristotelian view.

It would also be easy to produce examples of analogous relations of one thing inhering in another from the realm of outer perception, but I would rather not go into this any further here. The example from inner experience suffices, though, to establish beyond a doubt that Kant is mistaken in thinking that the concept of substance is not given in any perception and is therefore arrived at *a priori*.

93. It is to be conceded, of course, that when Kant speaks of "substance" he departs quite significantly from the valuable, old Aristotelian concept, for which he substitutes the concept of what "remains constant throughout each change." This trivialization of the concept of substance has harmed metaphysics because it obscures the understanding of the genuine concept of substance, and is of no advantage to the Kantian critique of Hume. For the concepts of one-who-changes and of one-who-remains-constant are surely connected with the general concept of one-who-is-temporally-determined. And it is likewise certain that anyone who recognizes the Kantian doctrine of an *a priori* intuition of

time for the fiction it is will also recognize that the concepts of one-who-changes and of one-who-remains-constant are derived from experience.

94. Before we leave this subject, let us return to the so-called categories which, like being and non-being, are not at all to be regarded as concepts. We've seen that these really amount to different kinds of judgment, which can in turn become objects of conceptual imagination. Even Kant betrays the suspicion of a connection between these alleged *a priori* concepts and the differences among judgments, since he goes to the trouble to prove that they are "fundamental concepts of the pure understanding" and to derive them somehow from the nature of judgment. But he completely misunderstood the nature of judgment.

He misunderstood it *in general,* inasmuch as he saw a peculiar kind of representation as yielding the essence of judgment. This idea is supposed to be the representation of a representation. All judgments are supposed to be functions of the unity of our representations. We've seen that this is just patently false for existential judgments, and it is not an appropriate analysis of any other kind of judgment either. He misunderstood the nature of judgment in its *particular* kinds. For example, concerning relational judgments, he confused differences of language for characteristic functions of thought. Moreover, because of his pedantic passion for three-part analyses, he indulged himself in the crudest arbitrariness. Thus, for example, he added to the distinction between affirmative and negative judgments a third type--infinite judgments--without noticing that these latter rather introduce a distinction concerning the objects of judgment. The situation is similar with his division of quantitative judgments into three--universal, particular and singular judgments. And even more confusion and arbitrariness governs his analysis of modality.

At the first spark of criticism, this entire theory of categories explodes.

Thus the *a priori* representations are in quite a sorry state. And yet these are the foundation upon which Kant erected his illusory system. Naturally this was only possible because he let himself make one arbitrary move after another. He left a fabrication which set a ruinous precedent and had the worst possible influence on an entire period in the history of philosophy.*

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* There is no dearth of attempts to save this Kantian *a priorism* by means of artful interpretation. Thus many have tried to see him as a precursor of the modern theory of specific sense energies. But it would be more appropriate here to look to Descartes, Locke and Berkeley, who recognized the subjectivity of qualities and gave it clear expression, for example, by establishing that sensory impressions are not images of things, but rather at best signs of them. This, together with the Aristotelian idea of one faculty which has access to the several senses, yields a doctrine of specific sensations. Kant's analyses are wide of the mark.

95. Once again, we could say that we had done enough to justify our complete rejection of Kant's views. Nevertheless we prefer to say just a little more about the limitations of inquiry which Kant himself imposed while attacking Humean skepticism. Not only did he thus surrender to Hume much that we are interested in preserving in the face of skepticism, but in certain respects he also spoiled what Hume had left untouched. And therefore it would be worthwhile at this very point to show the inadequacy and inconsistency of the Kantian theory.

There are three points I wish to enlarge upon here:

1. The first is the impossibility maintained by Kant of knowing a thing in itself; 2. the second is his contention that the so-called synthetic *a priori* cognitions (which include even the law of universal causation and the mathematical axioms) are only valid for objects of possible experience. I will show: a) that this would not suffice to save natural science and mathematics, and b) that even Kant did not confine himself consistently within these limits. 3. Finally, the third point concerns analytical laws. I mean to show that, though he was not at all aware of it, Kant himself actually taught that even analytical laws are of limited applicability.

96. 1. Kant was especially praised for the doctrine that *things in themselves are unknowable*. He shouldn't have been.

a) Even his way of proving this theory appears to be insufficient. In his opinion, this theory is an obvious result of the influence of subjectivity, which must necessarily falsify any image that occurs. Clearly he assumes that the thing in itself, if it worked alone, would give rise to an appearance that corresponded with it perfectly. (Subjectivity would do likewise.) But the two factors work together, and so they interfere with one another.

The presupposition here is that similar causes have similar effects. What is the justification for this? It is not intuited *a priori*. So experience must decide, but only concerning the sphere within which it is applicable; and so it is still conceivable that the two factors work together in such a way that they complement one another in producing an appearance which does correspond with the thing in itself. (The female bee, *by herself*, produces male bees, but together with a male she produces females. How silly it would be to claim *a priori* knowledge that this isn't so! And yet the case at hand is quite similar.)

Naturally I do not wish to deny that in fact many an effect is similar to its cause. In certain cases experience speaks in favor of such a similarity. I only deny the justification for assuming *a priori* that this is generally true.

Thus it is not proved, at least not by this move, that things in themselves are unknowable.

b) Moreover, it is not universally the case that they are unknowable, and if it were then absolute skepticism would result.

I say, the principle that things in themselves are unknowable is downright false. At least when construed universally, as Kant has it. For *inner experience* grasps its object as it is in itself, and thus as evident perception, is distinguished from outer perception. Descartes and Locke recognized this distinction, whereas Kant blurred it completely. It is just absurd to think that outer and inner perception are on a par in this regard, and to concede that both contain only "phenomenal truth!"

In order for color to exist as a phenomenon, the presentation of color must exist in itself. Otherwise, I ask, what is meant by, "Color has phenomenal truth"?

Does it mean: It is true that color exists *as it is perceived*? Then it just means that one-who-perceives-the-color exists. In other words, the phenomenal truth of outer perception implies the truth in itself of inner perception.

Does It mean: It is true only for the subject, and not for anyone else, nor for everyone else? Then the theory amounts to an adulteration of the concept of truth and a denial that anything is evident or known to us. (I do not believe that Kant could have meant to say this, but there are people who understand him this way.) Such a truth for me, as distinct from truth for you, is nonsense. If it is actually true that I have a given phenomenon, then it is true for anyone who judges likewise, indeed for everyone absolutely. This reading of "phenomenal truth" would reduce to the old subjectivism of Protagoras, which Aristotle denounced as confounding the concept of truth.

What could be meant by the limitation of truth to what is true merely for me? Is it supposed to mean: "Limited to what I hold to be true"? But then there would be no possibility of making mistakes--but neither would there be any understanding or genuine knowledge!

One could improve the definition: "What is true for me is what I hold to be true according to the laws of my own nature." But this comes to the same thing. For everything occurs according to the laws of nature, therefore everyone who judges judges according to the laws of nature.

Perhaps someone could say: Phenomenal truth means truth in the sense of a sign of what is in itself unknown. But how so, if this thing is so unknown that we don't even know whether it differs from one moment to the next? If this unknown cannot be taken for either a unity, or a multiplicity, nor for either a persistence or a vacillation, etc?

However that may be--it seems certain to me that people who talk about "phenomenal truth" without distinguishing between outer and inner perception (and Kant is chief among them) simply are not clear about what they really intend with their "phenomenal truth."

With regard to Kant in particular, one could raise an *argumentum ad hominem*. One could ask him: Is the intuition of space (or time) a phenomenon or a thing in itself? Assuming it's a phenomenon, then since it is purely *a priori* it must be the sort of phenomenon that corresponds completely to the only factor which works to produce it, namely subjectivity. But then spatiality (and temporality) belongs to what produces a phenomenon, therefore it is a thing in itself.

This argument seems to be convincing even though it applies only to Kant himself and works only because of his false presupposition. But clearly, it turns his entire doctrine upside down.

But let us stand by what may be said with general validity: The evidence of inner perception is incontestable, and it shows that the knowledge of a thing, as it is in itself, is possible and real.

97. 2. Kant imposed yet another limit on knowledge. The synthetic *a priori* cognitions are supposed to have validity only for objects of *possible experience*. And therefore it is not supposed to be possible, on the basis of the law of universal causation for example, to infer any transcendent fact.

This stipulation, too, proves to be entirely arbitrary. In truth, it is hard to see why, if the synthetic prejudices are valid for objects of experience, they may not also be applicable to everything we think about. For example, why isn't the law of universal causation applicable to the idea of God? Our idea of God is also conditioned by our subjectivity, as are all other ideas and images. So why the exception?

Someone might object that the idea of God is only conditioned by the subjectivity of the *understanding* and not by that of the senses, but the subjective laws of knowledge are valid only because they are conditioned by the senses. But I would reply that this claim is purely arbitrary, and all the more amazing in that according to Kant the law of universal causation is given with the category of causality--which category, however, is not supposed to be a form of sensible intuition but rather a fundamental concept of the pure understanding. So one would expect that this subjective law would have to be valid for the images of the understanding, if it is valid for anything. Everywhere you look the system is completely arbitrary!*

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*Someone might say, in order to escape the contradiction, that even objects of experience have only phenomenal truth. In that case I reply, fine, let's assume so. Then the distinction actually breaks down. And moreover, since Kant has the strange idea that phenomena are caused and have effects, the phenomenal truth of a God acquires legitimate significance. (It is true that it would be completely absurd to think of phenomena this way, if one otherwise regarded them as mere representations and thus not real things. But this absurdity is no problem for us--the founder of the Kantian system must be held responsible for it.)

98. But this limitation of the principles of knowledge is not only completely arbitrary, it also renders them insufficient to save natural science and mathematics from Hume's attack.

a) The natural sciences apply the law of universal causation in quite a different way than what Kant is prepared to allow. They never assume that a causal relation obtains between phenomena, but rather between the causes of phenomenal images, which seldom or never appear to us. In fact, causal relations between phenomena themselves would be absurd, as we've noted. It's not possible to break a window with the image of a stone. Phenomena do not fall, and do not enter into chemical compounds.

b) Natural science does not hesitate to go beyond the bounds of possible experience (e.g., to investigate things that are too small to be seen); and this is so not only when it seems to be impossible, but also when it has been proved that it will not ever be possible to have an experience of the object in question. Thus they apply the laws of mechanics even to atoms without any reservation.*

c) Kant's theory would be just as inadequate to save mathematics. For mathematicians now propose bold theories of hypothetical *n*-dimensional spaces, without worrying whether they've thus crossed the bounds of intuition and possible experience. Indeed, no mathematician today believes that his analyses are confined to the intuition of space. It would be necessary, in fact, if they were thus restricted to spatial intuition, to draw very narrow boundaries within three-dimensional space, since we can't intuit all of it.

Something similar would hold in the case of time. Mathematics, mechanics, biology, world history and in short all sciences would have to protest against the claim that one musn't go beyond what is intuitively given.

It is interesting that at one point in his theoretical system Kant admits (where the situation is obvious) that the restriction he imposes cannot be met. He obviously feels the need to enlarge the bounds of what is intuitive in itself. For who can intuit what a "billion" is? One simply deals with the numerals (according to Kant). But just by doing so one moves on to what is transcendent in itself.

99. It is easy to see, here, that Kant himself did not consistently abide by this restriction, and it is even more obvious elsewhere.

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*Likewise such tiny objects as we can detect only with the aid of a microscope remain for us unnoticeably small so that we know them only on the basis of other appearances which are their effects. They are not objects of possible experience. So how could we detect such things if the law of inertia, etc., could not be applied to infusoria, etc.?

a) He concludes, according to the law of causation, that there exist things in themselves. Here the object is transcendent, so that by Kant's own theory the conclusion cannot be allowed. Kant does draw the conclusion, though.

b) He also concludes that there exists something subjective. But is this a phenomenon? An object of experience? No! Like a thing in itself, the subjective is a factor contributing to the occurrence of a phenomenon, indeed Kant once suspected that it could be identical with a thing in itself. (A suggestion which is put into practice in Fichte's "*Das Ich-Nichtich.*")

c) And he concludes that there are mental phenomena we don't experience, i.e., that there are other minds than our own. You are not an object of possible experience for me. You may experience yourself, but for me you are transcendent. Nevertheless, I conclude that there are other thinking beings besides myself, and so did Kant.

d) Above all, he concluded that there is a multiplicity of thinking beings (as in "all of you," "they"). This multiplicity cannot be an object of possible, direct experience for anyone at all. All the same, Kant certainly accepted it.

Thus we find one contradiction after another.

e) These self-contradictions of Kant's become still more obvious in his cosmology, where he means to deny that synthetic *a priori* cognitions, and in particular the law of universal causation, can have application to the *totality of appearances in the world,* or to the entire history of the universe. For the world as a whole is supposed to be transcendent, and not an object of possible experience. The law of universal causation can only be applied to parts of the world, to single events and groups of events (to which, of course, it applies without exception). This is contradictory: if I should, and must, apply the law of universal causation to events in the world throughout every finite period of time--as Kant grants--then I should, and must, apply it throughout an infinite series of events.

(Consider the procedure of mathematicians, who regard universal validity as obvious in the case where what holds for the nth member of a series holds also for the $n+1$st member. Or think of the method of exhaustion when the properties of a circle are inferred from those of a polygon. Likewise in differential calculus.)

So there would be nothing left to do but to admit that the law of non-contradiction is of limited validity--which would be absurd, and would leave us entirely defenseless against absolute skepticism.

Besides, we've already touched upon the question of whether relatively larger parts of the world, and extended periods of history, are to be regarded as transcendent like the universe itself. Isn't it completely arbitrary for Kant to feel confident that the former are not transcendent, though he suspects the latter is?

100. 3. Again, one might feel that quite enough has been said. But there is just one other fact I can't forbear mentioning, namely, that if we look closely we can see that Kant teaches yet another limitation of the applicability of certain laws, which limitation he was not clearly aware of. This limitation is even more critical than that imposed upon the so-called synthetic *a priori* cognitions, since it applies to analytic cognitions and to the law of non-contradiction itself.

We have already noted that Kant teaches, in his cosmology, that one would be led into contradiction both if one held that the world is finite in space and time and if one held that it is infinite. That is, *both* the assumption that there are in space (and likewise in time) phenomena that are the farthest away, *and* the assumption that these do not exist, are contradictory. From this he infers only that we've strayed off into the transcendent. But since one assumption or the other must be true, according to the principle of excluded middle, if there really are phenomena, it follows that even the assertion that there are phenomena involves contradictions. Yet Kant is quite convinced of the existence of phenomena.

He likewise teaches that one would become entangled in contradictions both if one assumed that spatial phenomena are made up of ultimate parts that do not have further parts and if one assumed that this is not the case. But again, since one of the two assumptions must be correct, if spatial phenomena really exist, it follows that one cannot escape contradiction on this presupposition either. Therefore, the contradiction is involved in the assumption itself that spatial phenomena exist.

Thus it is obvious, upon close examination, that if synthetic *a priori* cognitions have no validity for the realm of things in themselves, then analytic cognitions such as the law of non-contradiction have no validity for the realm of appearances. Phenomena--which are the only things of which there is supposed to be any knowledge--are inherently contradictory; thus Kant paves the way for Hegel's proposition that all things are contradictory.

One can see how true this is when one considers that Hume, who was Kant's chief impetus for going into the difficulties of spatial and temporal divisibility, was actually quite skeptical about dispensing with continua altogether.

But clearly, if it's true, as Kant believes, that analytic laws alone will not suffice for the construction of a science, then rejecting these laws must make science impossible. Thus a phenomenal science would be just as impossible to achieve as a science of things in themselves.

101. Kant's battle against skepticism ends in defeat on all fronts.

I scarcely need to remark that his defeat does not make science itself appear defenseless. Kant was not right to regard these contradictions as inevitable, final consequences. Not at all! The law of non-contradiction holds. Neither things in themselves nor phenomena are infected with contradictions. In concepts, contradiction and incompatibility of attributes are possible, but never in an intuition.

And so we now come face to face with Hume's attack; and surely we are well prepared for the defense without any help from the miraculous intervention of the synthetic *a priori.*

Critique of Hume's Doctrine

102. Kant closes his *Critique of Pure Reason* with words of proud confidence. He believes he has shown the way to solve the great puzzles of philosophy, indeed he believes he's already achieved the solution, or nearly so:

> Only the *critical* way remains open to us. If the reader has had the will and the patience to follow it with me, then he can judge now whether or not he wants to join me along the way and make of this the great highway which centuries past have been unable to accomplish but which might yet be achieved before this century is over. It is the highway of human reason brought to full satisfaction in the desire for knowledge, which up until now it has pursued in vain.

How strangely the true value of his theory contrasts with what he claims for it! We have tested the foundations of his system and they have proven themselves entirely untenable. The whole structure must tumble down with them.

In reminding us of our conclusion, however, I feel the duty to mention once again that we must make the important distinction between the success of the enterprise and the mental power revealed thereby of the one who undertook it. Kant is certainly among the greatest minds ever, and his name will always be remembered in the history of our discipline, even though his work will not stand scrutiny forever. In a sense, it no longer stands for us today, since we've recognized that it all rests on an illusion and no part of it has a logically sound structure.

103. On the other side stands David Hume with his skepticism. Kant dedicated his whole strength to the struggle against him, and he remains all the more an undiminished foe for us. It seems we face a difficult task. Kant wanted only to save science for objects of possible experience--we are after something greater, namely that even the proof of God's existence should be possible. Kant took refuge in the alleged synthetic *a priori*

cognitions in order to achieve his goal--we abandon these and, with Hume, recognize only analytic axioms and facts of experience as sure foundations. Thus we attempt to accomplish more by means of less.

Nevertheless, we mustn't lose heart and regard our opponent as invincible. Indeed, common sense will be on our side when we say: If it is really the case that the attempt to prove God's existence must be given up as hopeless , still it couldn't be on account of Hume's skepticism that this is so. Either Hume's arguments have no bearing on our attempt, or else every endeavor of empirical science falls with it.

For upon closer examination we can also see that the Humean doctrine contains mistakes just as serious as Kant's, even though he does not indulge the same whims and love of unjustified constructions. So as far as this potential obstacle is concerned, the way lies entirely clear before us.

104. But before we can feel sure that this is so, it will be necessary to recall the most important features of his reasoning.

The following four points are chiefly to be considered:

1. According to Hume, the whole of our knowledge is divisible into two classes: into "relations among ideas" and "matters of fact." Or, which is to say the same thing, into analytic *a priori* cognitions on the one hand, and on the other, *a posteriori* cognitions which rest on perception (and memory).

Cognitions of the first class are some of them direct (like the mathematical axioms) and some of them indirect (like the mathematical theorems). Of those that fall into the second class, the *a posteriori* cognitions, at least the direct ones are certain for us.

2. If we ask how we are to establish a fact indirectly, the answer is: only on the basis of a causal relation. We will have to deal with the problem of causation, then, if we want to be able to form some judgment of the logical justification for a factual inference.

3. Above all it is imperative that we clarify the concept of "cause". Even the question of which impression it arises from proves embarrassing for Hume. He concluded that it is derived from the union of several impressions, none of which would yield causalty taken by itself. A cause, for him, is the regular antecedent which awakens the expectation that a certain consequence will occur.

4. But this expectation is not to be called rational. For in a logically correct syllogism, the conclusion cannot say more than what is contained in the premisses.

If someone objects that all human beings draw conclusions based on such expectations, Hume concedes only that the inference should therefore be regarded as natural for us, not that it is to be called rational, too.

But people draw conclusions which are both unnatural and irrational when they depart from what is habitual for them and extend their expectations beyond the realm of experience into the transcendent.

105. So this is the way Hume disputes our claim that we can undertake a proof of the existence of God. Clearly it is not overstating the case to say that on this point all empirical sciences and indeed all people of good common sense will side with us. To be sure, Hume' s skepticism is not universal, but it extends quite a lot further than just to the issue we address. If he had his way, there would be not only no proof of God's existence, but also no natural science. In both cases alike we would have only the illusion of knowledge. A natural scientist who concluded that there is hydrogen, for example, would be just as much in error as a metaphysician who ventured to prove the existence of God. It is of no consequence whether the error is to be called "natural" or "unnatural." The only important thing is whether the conclusion is true or false, rational or irrational.

But then, this is a theory which must appear suspicious from the outset. A clear refutation, however, will result only from careful consideration of the individual stages of Hume's argument. So we must keep these strictly separated in our discussion, in order to consider each more easily and more thoroughly in isolation.

106. Let us now turn to the first point, to Hume's classification of the kinds of knowledge:

1. All our knowledge, he teaches, involves either analytic *a priori* cognitions or *a posteriori* cognitions. This will not seem doubtful to us, since we've seen that there are no synthetic *a priori* cognitions. But I must remark that the presentation of this theory, to be found in the *Inquiry Concerning Human Understanding* (Chapter IV, Section 1), must arouse suspicions and could occasion some confusion.

That is to say, although Hume actually offers only a natural classification of judgments and cognitions, he speaks at the same time as though he had offered a classification of the objects of judgment and knowledge, which, however, is something else altogether. Let us hear what he has to say: "There is no difficulty at all in dividing all the objects of human reasoning or inquiry into two classes, namely relations among ideas and matters of fact." But then he goes right on to say: "The propositions of geometry, algebra, arithmetic, and indeed every judgment the evidence for which is grounded in intuition and demonstration, belong to the first class... Propositions of this kind are arrived at through the activity of the cognitive faculty; they are not dependent on anything whatsoever that is to be found in the world." But shortly thereafter we hear again: "Matters of fact, the second kind of objects of human reasoning..." The matter will become clear upon consideration of the fact that to every act of knowing there corresponds something that is known, and that if one can speak of *a priori* and *a posteriori* knowledge, then one can also speak of *a priori* and *a posteriori* objects of knowledge. Nevertheless, in view of the gravity of any error on this subject, the keenest attention is required in order to get clear on the respective extents of the domains of knowledge and of things known.

a) Thus apparently it is not initially inconceivable that something could be known both *a priori* and *a posteriori*. Archimedes meant to establish the area of a parabola in this way,[16] as did Gauss the fact that the sum of the angles of a triangle equals two right angles. Here we have the same object, the same truth, but it is known in different ways, so that we have to say that one and the same proposition is both a "relation of ideas" and a "matter of fact," both an analytic *a priori* cognition and an *a posteriori* one. But this can't be right, at least not if it must be one or the other.

It seems that from the very beginning Hume rules out the possibility that the same thing could be known both ways.

b) Also, it is not initially inconceivable that a conclusion could be drawn from a conjunction of *a priori* and *a posteriori* assumptions. In fact, it is obvious that this can be done. An example is offered by the syllogism with these premisses: "All triangles have the sum of their angles equal to two right angles"; and "This figure is a triangle." And again: That a certain body before me exhibits a definite relation of its surface to its interior is a fact. That it is a sphere is a fact. The latter may be inferred from the former with the help of analytic propositions. And again: A is an apple, B is an apple, C is an apple. Therefore, since $1 + 1 + 1 = 3$, there are three apples. But how shall we classify this conclusion? Obviously it is among the truths which are known *a posteriori*.

Hume doesn't state this explicitly, for the reason that he doesn't set much store by such cognitions. But it is not clear from the outset just how important they really are, and in any case it seems worthwhile to point this out.

107. 2. In fact, we encounter the results of this omission upon examination of the second point as well. The contention that a matter of fact can be established indirectly only on the basis of a causal relation is decidedly false.

If "Every M is P" is analytic, and "S is M" is empirical, it follows that "S is P," and this is an inference concerning a matter of fact. There need be no mention of any cause or effect. As the example just mentioned shows, the connection can be established by a purely mathematical relation. If one were to speak of the concept of causation here, this would be to alter it improperly.

108. 3. But let us see how Hume arrived at the concept of causation.

The method he employed in this inquiry is basically to be approved of. One must proceed by seeking intuitive examples from which the concept in question can be abstracted. One can expect to produce a clarification and illustration of obscure and controversial concepts only by going back to experience as their source, and not by making arbitrary and unnatural pronouncements. We mustn't just take what we cannot analyze and call it *a priori*! But Hume's handling of the method is unfortunate--at least in this case--for the concept he thus comes up with is not true to the way we commonly see the concept of causation employed in science. According to Hume, a "cause" would be one of our more frequently experienced impressions, which habit leads us to expect will be followed by a second, distinct impression. But the Scottish philosopher, Thomas Reid,has shown that on this reading even the nighttime could be called the "cause" of the day. (Actually, though, it is an effect of a position of the sun, which precedes a position of the sun that causes the day.)

Moreover, Hume contradicts himself when he says that a cause is an "empirical antecedent." According to him every inference from one matter of fact to another is supposed to be an inference from a cause to an effect, or vice versa. Let us consider an example. We see before us something yellow and conclude that because it has the color of gold it will have the sound of gold if we strike it. According to Hume it is a causal relation that leads us to make this inference. But how so? Perhaps the color of a golden object is the cause of its sound, or vice versa? Obviously neither. Rather, we infer from our visual impression that a piece of gold is present to us, and to this piece of gold we attribute the capability of arousing in us a certain audible impression. But what do we mean by "gold"? Nothing but the (intrinsically *imperceptible*) cause of these effects. Therefore in this case "cause" is *not at all* an empirical antecedent.

Thus Hume's definition is flawed on both sides: On the one hand it goes beyond what belongs to the concept of cause, and on the other hand it fails to render the concept fully. For many things that ought to be called causes do not satisfy his definition, and others that satisfy the definition ought not to be called causes.

So it is clear that despite the mental acuity with which he carried out his analysis, and the favorable impression it made on many, still he did not correctly determine the content of the concept of causation. But what is the true concept of causation, and what is its source?

109. In cases where the source of a concept seems questionable and raises difficulties for us, it is wise to look for it in the domain of inner experience. Now Hume certainly did not neglect this, but in this case he did not find the right point within the domain of experience, or if he did find it, he was misled by ostensible objections. He thought that we first obtain the concept of "cause" when we see one thing follow another more than once. Prior to that, we are aware only of a temporal succession. But this is not always so in the domain inner experience.

For example, when we construct a syllogism, the thought of the conclusion follows the entrance into consciousness of the premisses, and indeed follows them in time. But it is not merely this relation of preceding and following that we grasp, but also another quite different and special relation. And this determines us, even when we've drawn the conclusion for the first time, to say that it arises from the premisses, that it is not merely their successor but also their effect. It is not a mere "after which" that we grasp here, but rather a "by means of which."

Or consider the case of a direct insight. I intuit the axiom, for example, that what is true is not false. In order to pass this judgment I must have formed ideas of the true and the false, of course. But between these and the apodictic judgment rejecting their union I am not merely aware of a temporal relation, but rather I also notice that my judgment has its source in these ideas of mine. The judgment becomes obvious to me on the basis of the concepts which form the subject of it. And in order to understand this connection, I have no need to experience a hundred times that this judgment is appropriate to the relevant ideas.

Another example: I desire something as the means to a certain end. My act of will is two-fold, then; I will the end, and for its sake I will the means. Perhaps the latter follows the former in time. But am I aware only of this temporal relation between the two? No, I immediately admit that the one results from the other. I am aware that willing the end causes me to will the means. And moreover, in order to notice this, I do not need to have willed the one after the other repeatedly.

So these are the cases in which we actually observe the operation of a cause, and on the basis of these we generalize the concept and carry it forth into nature as a "power" of explanation, just as we do with many other concepts that are drawn from inner experience. We also apply the concept of an end as a principle of explanation in nature, although ends are as impossible to see, hear, and taste as causes are. Whenever we speak of an effect we mean--because the concept is such a universal one--a real thing, which is determined to go from non-being to being right when it is caused and becomes an effect. Hence the multiple meanings of the phrase "as a result of."

110. Perhaps it will strike many as quite strange that the facts, with reference to which we've elucidated the concept of cause here, should have escaped Hume's sharp eyes, though it is right at this point that he conducted his inquiry with such great care. And I don't believe he missed them. Rather, Hume probably did find the source of the concept of cause in the places we've indicated, but then began to doubt his discovery. In fact there appears to be an obvious objection to the claim that we notice causation in the cases mentioned above. One would think that if we did then we would have to notice a *necessary connection* of the "cause" with the "effect." But is this really the case when we draw a conclusion on the basis of premisses? Or, when I think of an axiom, does the apodictic judgment stand in necessary connection with the thought of the relevant concepts? It seems this cannot be maintained. But if it is, then it must be maintained, too, that whenever there is an "empirical antecedent," then the expected consequence always occurs which, however, is not the case, as experience serves to show. It happens not infrequently that one thinks of the relevant ideas or the relevant premisses, but then hesitates actually to pass the judgment that could be inferred from them. So there seems to be no necessary connection here, and thus no causal connection either.

Or is there some mistake? Is the objection really so powerful that it cannot be disposed of?

Someone might think to defend our position in the following way: The concept of necessity is not contained in the concept of causation. There are many who really believe this, and many of them make use of this notion in the indeterministic doctrine of freedom of the will, in that they see the freedom of the will not in its having no causes at all, but rather in its having none that determine it necessarily.

This way out seems questionable to me. But for that reason another way seems all the more practicable: there is no universal necessity that those concepts evoke this axiom, or those premisses this conclusion since, indeed, the concepts, or premisses, are not the only factors involved in producing the axiom, or the conclusion. There are many other factors involved, some of which we are not conscious of, for example, processes in the brain. But this does not rule out the possibility that in a given case all the factors are present such that the effect occurs necessarily. But just as it is not only the body as a whole that moves, but also each of its atoms, so in any complex of causes that work together each of these causes has its effect. And nothing says that one cannot be aware of just one of these without being aware of the operation of the others. One who perceives the effect knows full well that a necessary connection obtains *hic et nunc* in the given causal relations taken together, but he can know this without complete knowledge of what these relations consist in, without knowledge of the collective *conditiones sine qua non.*

111. 4. We must now examine Hume's fourth thesis, namely, that it is a fact that we do expect things to happen on the basis of a causal relation, but that we have no logical justification for drawing such conclusions.

The inquiry is complicated because, as we've seen, the true concept of causation differs from the one put forth by Hume. His argument is naturally suited only to his interpretation. So it is to be conceded,without further ado, that expectations which merely accord with habituation are not rational as such. Indeed, experience itself shows that expectation in accord with habituation is not always certain . For such expectations are often frustrated. Whether *all* experience is therefore worthless is another question, to which we intend to return.

With regard to our concept of causation the situation is similar. For we've seen that one case of a cause having a particular effect does not guarantee that it will have that effect in all the cases that are indistinguishable for us. Consider the surrounding conditions, including negative or privative ones, which result from the possible interaction with, or frustration by, other forces. Certainly there are additional specific conditions that must be fulfilled if a matter of fact is to be inferred in a particular case on the basis of a causal relation.

112. Clearly there needs to be a substitute for the Humean theory of inferences from one matter of fact to another, based on an essentially different theory. Such a theory will provide the criterion of whether experience justifies an expectation or not and to what degree it does so (since we do not always expect things with the same confidence). It will also reveal the conditions under which particular causal relations play a role in a justified inference concerning a matter of fact. It will show how far the irrational force of habit agrees with the requirements of reason. And finally our theory will show whether an inference to a transcendent fact must always, and in each case, be condemned as irrational and unnatural.

For it is as obvious as can be that Hume's double anathema has lost all meaning, once it is seen that the force of habit, whichever way it leads us, cannot be decisive.

113. The picture that appears upon looking back over the inquiries we've conducted today is again essentially a picture of destruction. But what has been destroyed must be replaced.

It has become clear to us that Hume's theory of causality is not flawless. Two big mistakes are of primary importance:

1. The false formulation of the concept of cause.

2. The failure to appreciate the truth that there are inferences from one matter of fact to another in which the required links are formed by

analytic principles, principles which often have nothing at all to do with causal relations.

114. Now others have taken the stone that Hume cast away and made it the corner stone of their structure in such a way as to make it possible for us to have a genuine insight into the logical connections of inferences from one matter of fact to another. I will go into this next time, as far as is necessary and allowed by the time available. Today, just two more remarks:

If inferences from one matter of fact to another are to be justified, then the universal laws of logic must be applicable to them. No exception to these can be made for them. Therefore the danger of error must be ruled out. And it is, in two cases:

1. When the premisses involve the conclusion;

2. When the premisses involve the infinite probability of the conclusion. Then it is "as good as impossible" that the conclusion is false.

If the premisses involve a lesser probability of the conclusion, then the conclusion is not justified. Rather, a different conclusion is to be drawn from the given facts, namely the appropriate probability of the conclusion, which can be very valuable in certain situations.

This remark leads to the further observation that probability plays a large role in inferences from one matter of fact to another. Thus the understanding of the connection between probability and causal inferences grew with the development of probability calculus to which Pascal and Fermat gave impetus before the time of Hume. To judge by his discussions of probability in the *Inquiry Concerning Human Understanding*, Hume knew nothing about this. Otherwise he would have been able to find, in the *ars conjectandi* of Bernouilli, laws of inference that were suited to liberate him from his skepticism.

Therefore it is essentially the mathematicians we have to thank for freedom from the fetters of skepticism, whose bonds the Kantian critique struggled so fruitlessly to escape. Despite the need to be brief, I hope to show you clearly how probability theory provides strength and justification for induction, for the assumption that causal relations obtain in the external world, for the knowledge of the universal law of causation (that nothing comes to be without a cause), for more specific causal laws (e.g., the law of gravitation), and for many kinds of inferences concerning new matters of fact on the basis of direct, or more complicated, connection with causes and effects of given facts.

If we've correctly recognized the logically binding power of calculations of probability, then we will also recognize that the attack against inferences concerning transcendent things has lost every point of support.

The True Nature of Inferences from One Matter of Fact to Another

115. So we raise the question once again: Is an inference from one matter of fact to another logically justified?

Our answer is a decisive, "Yes."

I. Indeed we say so above all because it is possible for one matter of fact to be involved by another.

Thus we can reason:

1. From a whole to its part (taking the words "whole" and "part," not merely quantitatively, but in a much broader sense, including metaphysical and logical parts as well as physical ones).[17]

Under this heading there are also to be included inferences from a fundament to a relation. Here we have "relations of ideas" in the Humean sense, which, even if they don't make new facts known all by themselves, still enable the passage to new facts from those that are already known. (For example, it is a fact that this body has a certain relation of its surface to its interior; and it is also a fact that this body is a sphere. But I can infer the former from the latter.)

2. From the completely enumerated parts to a whole. And thus from the addends to the sum. Here, too, the whole can be taken in a broad sense. Where the whole is not a quantity in the strict sense, the parts are also not addends in the strict sense.

3. From one correlate to the other. (From a bridegroom to a bride.)

4. From the existence of what is universal and indeterminate to what is specific and individual, (e.g., from the fact that there is a dog to the fact that it is either a poodle, or a Pomeranian, or a bulldog, etc.; from the fact that a judgment is made to the fact that it is either an affirmation or a denial, or in any case that it is a certain type of judgment; from the fact that there is a red thing to the fact that it is either here or there; from the fact that there is a sound to the fact that it is either louder or softer, higher or lower or of intermediate pitch, etc.).

5. From a boundary to what is bounded. It is a peculiarity of boundaries that they do not exist in themselves, but can only exist as part of a continuum. Every continuum ultimately consists in ever so many boundaries, but not in the way a sum consists in its addends. For since a boundary does not exist in itself, it cannot by itself be added to or taken away from anything. Nevertheless, each boundary exists and as a boundary it contributes something to a continuum. (As an illustration here, consider the fiction of a colored surface,[18] bounded by a red line and

a blue line between which a continuum of violet shades intervenes.) Among boundaries such as these there are the points in a line, the edges of a plane, the surface of any body, the instants in time, etc.

By virtue of this peculiarity of boundaries we can also say that the following inferences are admissible: From a boundary to the thing bounded, and from a boundary to an infinite number of boundaries; from an instant to a period of time, and to an infinitude of instants; from a point to a line, a surface, a body, and to an infinitude of points. And if there is a red line we may infer that there is a colored surface which is either completely red or else approaches red in infinitesimal degrees.

6. From the existence of something to the non-existence of what is contradictory to it or what is positively incompatible (*positiv Widerstreitend*) with it. (For example, from the fact that a certain body is alive to the falsity of the assertion that it is lifeless. From the fact that something is red to the fact that it is not green.)

7. From actuality to possibility.

8. From (present) existence to future existence in the past or to past existence in the future. (Not in the sense of "*fuit Ilium*," but just as we often hear it said, of something which still exists, also that it has existed.)

9. From the number of "equally possible" cases actually given to the probability in one case or in one taken from a particular sample. This probability, too, is a matter of fact.

These 9 ways of reasoning do not amount to an exhaustive account of the cases in which we make an inference from one matter of fact to another because the latter is involved in the former. Nevertheless they may suffice to establish how frequent and varied such inferences are, and that they do not appear to be without significance for the advancement of thought.

116. II. But our inferences from one matter of fact to another are not restricted to this class. There is yet another class of such inferences, namely those in which we infer a matter of fact, not because it is itself involved in another matter of fact, but because its infinite probability is. Here we do not need to look for complicated examples nor to distinguish a variety of cases. It will suffice to remark in general that in many cases we infer the reality of a matter of fact from its infinite probability. Let us illustrate this with an example: I claim that a bowling pin thrown up into the air will not come to rest on its head when it falls. In contrast to the other cases we examined, the possibility of error is not absolutely ruled out here, but it is as good as ruled out. One speaks in this case of "physical" certainty as opposed to absolute or "mathematical" certainty.

117. So this much is clear: We can infer one matter of fact from another and, at that, in a logically correct fashion, sometimes with absolute certainty and sometimes with physical certainty. Let's go on! We might ask: *What kinds of matters of fact may be inferred from other matters of fact?*

Here again it will be good to divide the general question into several more specialized and detailed ones, so as to take a close look at the points which are particularly important for us. So I ask first of all:

1. *Is it possible for a universal law, which can also be known analytically, to be inferred from matters of fact?*

Yes, without a doubt this can happen and does happen frequently. As examples we may note those already mentioned--Archimedes' proof of the partial area of a parabola, or Gauss's proof of the sum of the angles of a triangle. A example simpler than these: in one case exact measurements have yielded the result that in a given circle the central angle is equal to twice the corresponding peripheral angle.* From this I can infer the general principle, since it is infinitely improbable that only this circle should have this peculiar feature.

2. *Is it possible make the factual inference that one matter of fact is determined by another?*

Of course. In the cases we've just considered the specific fact is determined by the general principle, and the individual case by the specific principles.

118. 3. Is it possible to infer a causal relation?

We're now asking about causal relations in the *strict* sense, and not in the broader sense indicated earlier when we spoke of a relation of determination between a fundamental principle and a derived one. This question, too, is to be answered affirmatively.

One very broad area within which causal inference's are made is that including cases of continuity, whether spatial or temporal. These present us either with the specific identity of something that occupies space, or at least that persists throughout an interval of time, or else they present us with infinitesimal changes that may be either complete, or partial, or one-sided. (Or it could be that all at once there is an abrupt change.) Here, I say, we surely do not perceive a causal relation, but we can nevertheless infer one with perfect certainty. For how could there be such an infinitesimal transition from one thing to another if they were absolutely independent of each other, if one part did not determine the other, and if there were nothing present that determined both?

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* Imagine a right triangle drawn from the center of a circle to its periphery. (Tr.)

Similarly it is possible in other cases to infer at least the probability of a causal relation. For example, according to the method of concomitant changes. (Thus we infer what the cause of pain is when a finger is burned by fire.) Other regular antecedents also lead to such conclusions, sometimes directly and sometimes indirectly.

119. 4. *Is it possible to discover a special causal law?*

Such causal laws are either:

a) Empirical laws, in which case there is an indissoluble complex of conditions that must remain constant if the law is to hold true. Or else they are

b) fundamental laws, and secondary laws derived from (explained by) the fundamental ones, (the secondary laws being analogous to the theorems, and the fundamental laws to the axioms, of mathematics).

The empirical laws have no validity for cases that are far removed from the domain of experience; indeed, their probability diminishes steadily well before that domain is left behind. Nevertheless, their probability is often very great, and actually infinitely great in some cases.

(If I know a law for calculating the velocity of light transmission, but without having properly analyzed the complex of conditions, and if I now apply the law to my experience, e.g. to this region of the atmosphere where I happen to be, then I do so with a fair amount of confidence. On the other hand, I could make a mistake if I extended the law to the transmission of light in water without qualification. This change in the circumstances could be of no consequence, or it could be very significant. As long as I don't know which, I will leave the domain of my experience only with great care. The law of gravitation has an enormous place in our experience, but not an unbounded one. So I cannot say that every extended thing has gravity.)

What kinds of causal laws may be constructed on the basis of matters of fact?

Certainly empirical laws may be constructed with great, indeed often with infinite probability (according to the law that the probabilities of the hypotheses are related to one another in the same way that the probabilities of the events to be explained are, upon presupposition of the hypotheses). The natural sciences are full of examples.

120. 5. *Is it possible to infer the law of universal causation on the basis of matters of fact?*

It seems more doubtful that fundamental laws can be established by matters of fact, and for this reason, too, that genuinely apodictic secondary laws can be established by matters of fact.

Even the law of gravitation provides no example of this. Perhaps one would like to believe that if a special causal law can be established by matters of fact, then so can the law of universal causation, according to which everything that comes to be has a cause. In this case, it seems we're not saying that something which, in the domain of our experience, required a cause in order to occur, would not require a cause under certain other conditions that don't obtain for us. For these other conditions would themselves be the causes that would make it possible. Here it seems, then, that one can say without qualification that one has come up against a fundamental law and established it by matters of fact.

But upon closer inspection it is clear that this is a suspicious argument. One thing, of course, is easily shown, namely that what once required a cause always requires a cause. But this is very far from saying that everything that comes to be requires a cause.

Indeed, despite the fact that everyone would concede that the law of universal causation could be proved to be a fundamental law on the basis of matters of fact, there are many who say that this is no way to establish that it is an empirical law. Thus Helmholtz in his *Physiological Optics*, among others. And why does he contest its status as an empirical law? Because he believes that in most cases we cannot specify the cause in question, and so the requisite inductive basis is missing. Now in order not to have to abandon the law of causality altogether, there is no alternative, according to Helmholtz, but to declare that it is a synthetic *a priori* judgment.

121. That it is a mistake to take this route is beyond a doubt for us, in view of our earlier discussions. But even the turn Helmholtz made just before going this way should arouse our suspicions. The reason he declares the law of causality to be a synthetic *a priori* cognition is that the empirical justification of it fails. Clearly the law of causality is only a kind of postulate for him. "One must postulate it since it cannot be proved." But this is quite an unreasonable demand to make of us, and one that logic would bid us reject.

In fact, even his very first contention is mistaken, I mean the proposition that the law of causality cannot be satisfactorily proved even to be an empirical law. Even if it is true that causes often cannot be specified, the conclusion that Helmholtz draws from this is inadmissible. He ought rather to have distinguished here between the knowledge of what the cause is and the knowledge that a causal relation obtains. The latter is assured whenever there is a continued existence, or a steady process. But everywhere we look we see one or the other, as far as our experience reaches. In order to give expression to this, the phrase was coined, *Natura non facit saltum*. (This metaphor makes a poor comparison, since even a leap is a process; but the word characterizes the situation all the better for that reason, inasmuch as the whole of nature offers no example and thus no truly appropriate image of what the saying asserts cannot occur in it.)

Thus, Helmholtz to the contrary, the law of causation possesses, in the highest degree, an empirical guarantee. But this does not suffice to assure its absolute, transcendental universality. It would be a mistake to believe in view of its empirical validity alone that it can be affirmed of every x, and even of every transcendental thing. In truth this would be rationally justified only if the proposition, that nothing comes to be without a cause, is assured not only on the basis of experienced facts but also *a priori*.

122. But if it is assured *a priori*, then this means it is assured by an analysis of the concepts. In fact, diverse attempts have been made to make it appear to be analytically evident. But most of them cannot withstand criticism.

Thus many were of the opinion that a thing which comes to be and a thing which has an effect are correlates, so that for everything that comes to be there must be a corresponding cause, just as for every convex surface there must be a corresponding concave one. But this isn't right; the true correlates are rather a thing which has an effect and the thing on which it has an effect. And it remains to be proved that each thing which comes to be is also a thing on which something else has an effect.

Christian Wolff argued that if something had no cause then nothing would be its cause, but that it is just absurd to think "nothing" could be a cause. This attempt, too, is entirely misguided, since the two propositions, "A has no cause" and "A has a cause, which is nothing," are not identical. The fact that the second is contradictory, therefore, does not without qualification serve to refute the first.

So these methods don't work. But others do, even though they are not as simple, and there is at least one of them for which our earlier considerations have prepared us.

123. We have seen that a causal relation is assured wherever there is any continuity. Not because the concept of cause is contained in the concept of continuity, but because it is to be maintained with physical certainty that there can be no continuity without a causal relation. Thus by analysis (*a priori*) we can convince ourselves of the universal validity of the causal law--the law that nothing comes to be without a cause--and not only by showing that the concept of cause is given in the concept of each thing which comes to be, but just by showing that the concept of contintuity is given in the concept of each thing which comes to be.

But this is very easy. For the concept of coming to be contains the concept of time, indeed of a two-fold time, a time of being and a time of non-being. To come to be is to begin, and the beginning is the temporal boundary between a period of non-being and a subsequent period of being.

A priori proof of the causal law

124. The proof that no real thing comes to be without a cause is most clearly produced by an examination of the several types of cases in which this might be thought to occur.

a) The simplest and yet most plausible case is that in which a real thing that can supposedly come to be by itself has a logically contradictory opposite, but nothing that is physically incompatible with it.[19]

Obviously those cases are more complicated and less plausible in which what can supposedly come to be by itself is such that something else could be physically incompatible with it. Because things that are physically incompatible cannot exist at the same time, it is certain that one of the two things that are physically incompatible cannot come to be as long as the other continues to exist.[20]

Now if it is assumed that the one thing can come to be by itself, then there are two alternatives: Either 1) this can only occur when the specific, physical opposite does not exist (in which case perhaps its coming to be is already ruled out because of physical incompatibility);[21] or, 2) if one wishes to avoid this limitation, then one must make the assumption that its physical opposite can cease to be by itself, together with the assumption that the thing can come to be by itself.

We will subject these cases to a separate examination. But first let us turn to the simple case.

The question was, can it be assumed that a real thing ever comes to be by itself, assuming that its only conceivable opposite is its logical contradictory?

It is easy to see that this question is to be answered negatively. For if a thing is to come to be, then (this is the very first requirement) it must fail to exist, and at that it must fail to exist for a period of time. (For a merely instantaneous interruption of its existence would not be a real interruption but rather an absurdity, since anyone who speaks of such an interruption as though it were a real period of non-existence is treating a boundary as though it were something in itself.) So it is necessary that for a period of time it fails to exist. But since it is supposed to be a thing that can come to be by itself, it could just as easily have begun to exist at any one of the earlier moments in the period of its non-existence, rather than at the end of that period, which is when it actually began to exist. Indeed, at another such moment the probability that it would come to be was 1/2. The same holds for any point in time between that moment in the period of its non-existence and the end point of the period. The same for a third such moment. The same for infinitely many individual moments. The probability at each was 1/2.

What are the chances that the thing will not come to be at any of the moments, although the probability was 1/2 that it would come to be at each of those at which it had not yet come to be? We must multiply. So the probability is $(1/2)n$, where n is the number of moments. If n were equal to 64, like the number of squares on a chess board, then the ratio would be less than one one-quintillionth. But in fact the number of moments is greater than any given number, it is absolutely infinite. Thus we can say with complete certainty that something like that will not ever occur, i.e., that a thing whose only opposite is its logical contradictory will not fail to exist, even for the very shortest period of time, if it can come to be by itself. But if it cannot be assumed that it will fail to exist, even for the very shortest period of time, then it also cannot be assumed that it will ever come to be. Therefore it is obvious that we are justified in denying that a thing whose only opposite is its logical contradictory could ever come to be without a cause.

125. b) Let us turn now to those more complicated cases concerning real things which could have physical opposites as well as logical contradictories.

If we assume that among these real things there is one that can come to be by itself, then we may recall the two principal ways this assumption can be construed. First of all, I said that one could think that the possibility of spontaneous coming to be is limited to those instances in which none of the physical opposites actually exists. Then in the cases where a physical opposite does exist, spontaneous becoming is already ruled out for that very reason. But in the case where none of the physical opposites exists, the proof we've just constructed will be applicable.

Objection: But someone could raise an objection here, which I will rebut quickly. Someone could say: As long as one of the physical opposites exists, the real thing which is supposed to be capable of spontaneously becoming could not come to be. But perhaps the physical opposites could cease to be at some time. From then on the real thing could come to be. And according to the demonstration we've just produced, after that moment the thing couldn't fail to appear, even for the very shortest period of time. But for this very reason it is to be expected that the thing will come to be by itself immediately at the first moment this is possible.

I reply: When it is assumed that the physical opposites of our real thing cease to be, what kind of ceasing to be is this? Is it brought about by a cause? Or is it uncaused? If the former is maintained, then it is obvious that when the cause of the ceasing to be of the opposites is effective, and as a result our real thing inevitably and immediately enters into existence, then the following will be true: The cause which negates the opposites is the cause of the coming to be of the real thing, since its efficacy necessarily leads to the existence of the real thing.

But if it is said that the physical opposite ceased to be by itself (without a cause), then it is clear that the existence of the physical opposite does not prevent the real thing from coming to be without a cause. So here we no longer have the same kind of case, but rather we have the other kind of case that we distinguished, the one which remains to be examined and which we will now analyze.

126. c) We will see that in this case, too, and no matter how the conditions are altered, our basic idea is upheld.

What is at issue here is a thing which has physical opposites in addition to logically contradictory ones, and which is assumed to be capable of coming to be spontaneously, whether or not one of its physical opposites exists. (Whereby it is obviously admitted chat the physical opposites can cease to be by themselves.)

The number of relevant physical opposites can be thought to be either finite or infinitely large.

a) The first alternative requires no new argument. For if we assume that, though the opposites can disappear by themselves, only the real thing we have in mind can come to be by itself, then, as before, we get a probability of 1/2, at each moment in its period of non-existence, that it will not come to be. It can begin to exist after a physical opposite has existed, just as it could after a logically contradictory one. Thus we get the physical impossibility that it ever fails to exist, even for the very shortest period of time, as long as it could possibly exist. And consequently we also get the impossibility of its ever coming to be.

But if we assume that each of the positive opposites can come to be by itself, just as the real thing can, then, because the probability of each of them is the same, for the real thing's failure to come to be at a single moment we get the ratio of probability $n/(n+1)$, instead of 1/2. But this difference would be insignificant, since $(n/(n+1))^{\infty}$, like $(1/2)^{\infty}$, is the expression of an infinite improbability.

b) The situation is different if we assume that the possible physical opposites are infinitely many, as is usually the case in the world of experience, and if we also assume that the thing can come to be by itself even when one of its physical opposites exists (since these can cease to exist by themselves), and if we make the same stipulations for each of the physical opposites. On such presuppositions, in the case where the thing does not exist, it is not to be expected that it will immediately come to be, since in addition to the thing there are infinitely many other possibilities with the same chances of coming to be. So the probability that the thing will come to be is infinitely small at each single moment, and consequently it can indeed be assumed that the thing would not exist for any period of time.

But then, this arouses our previous suspicions from another angle and, if possible, to a greater degree. That is, if it was unthinkable on the earlier presuppositions that the thing should fail to exist for a period of time, now it appears to be impossible that it should exist, even for the very shortest period of time. For, at each moment of its existence,its ceasing to exist would be expected and infinitely probable. And so how is it supposed to be conceivable that it continue to exist throughout an entire interval of time, since even the shortest interval must contain infinitely many moments like that? Thus what previously held for the possibility of its non-existence now holds for the possibility of its existence. It is to be denied absolutely. Now a subsequent period of existence is just as essential to becoming as is *a prior* period of non-existence, and so its becoming appears to be impossible, too.

127. 1. OBJECTION. But here there arises an objection that deserves to be considered. Someone might say that our argument is not entirely sufficient; for there are two kinds of existence throughout an interval of time. The one is a continued existence at rest, and the other is a continuity in the sense in which a movement is continuous when it is a process during which there is a steady and perhaps quite irregular change in the parts of a thing that moves now faster, now slower, now in one direction and now in another. So it is possible that in the midst of the flux of its physical opposites, the thing whose uncaused becoming we discussed could attain momentary existence.

Reply: There cannot even be the kind of continued existence that a movement has, if it is possible at every moment for any physical opposite to generate itself in place of the thing that supposedly continues to exist. For even at a single moment it would be infinitely improbable that the physical opposite to appear would be one of those that are very much like the thing in question. For the class of physical opposites that are very much like it is imperceptibly small in comparison with the class of those that are farther removed. Therefore an endless repetition of opposites that are very much like the thing would have a probability of $(1/\infty)^\infty$, which makes it completely inconceivable.

2. OBJECTION. Yet another objection could be posed: It could be said that the hypothesis put forth in the first objection might be tenable if we impose the following limiting conditions on uncaused becoming. Let us assume it is not possible for just any physical opposite to generate itself in place of one of the others, but rather only those that resemble each other most closely can replace each other. In that case all those difficulties seem to disappear. For we'd expect to have a steady, but otherwise irregular, process of change.

Reply: It is to be noticed, first of all, that here what is stipulated is no longer a case of completely uncaused becoming. The thing that once existed appears by its peculiarities partly to govern the thing that comes to be, since it determines it to belong to the class of things that are very like itself rather than to be among the opposites of this class that could occur.

Furthermore even this, as it were, partial uncausedness or randomness appears also to be unacceptable, and it is to be refuted in the same way as completely uncaused becoming was.

This becomes obvious right away when one considers that each infinitesimal alteration in a certain direction is impossible without some finite degree of change on that side.

In order to make this more intuitive let us consider the simplest case, that of a one dimensional continuum in which, of course, change can occur only in two directions, forwards or backwards (positive or negative). An infinitesimal change on one side or the other is possible only as a part of a finite change on that side. Now because an uncaused change on that side has a probability of 1/2 at any single moment, this would be to require something which has a probability of $(1/2)^{\infty}$, that is, something which is absolutely inconceivable.

Such a thing cannot occur, therefore. But the situation is quite similar for continua of several dimensions. Let us take, for example, the case of a two-dimensional continuum. We can imagine it by means of a point located in a plane. Even if we think of the point as moving along the most irregular path, it will still be evident that, whichever straight line we pick that intersects the point, the movement of the point will carry it some finite distance away from the line on a given side of the line and only then will the point perhaps move closer to it. So once again we have the infinite repetition of the probability ratio 1/2, since there are as many possible paths leading closer to the line as there are leading away from it. And the same holds for continua of 3, 4, ... *n* dimensions, indeed for continua of infinitely many dimensions.

Thus we see that even this limited introduction of the element of chance, even if it is in some sense infinitely limited, is absolutely inadmissible in any domain whatever, just as is the assumption that chance completely governs the coming to be of things. There could never be a continued existence at rest, nor a persistent existence in the sense of the process of a continual change. Therefore nothing could exist in time. Therefore it is utterly inconceivable that anything should come to be or pass away without a cause. And so we've proved, as I said we would in the beginning, that the principle of causality is universal, admits of no exceptions, and extends to the entire domain of experience. And the proof has been purely analytical on the grounds that the concept of time is contained in the concept of coming to be, and that the concept of continuity is contained in the concept of time.

It is a fact--nothing comes to be without a cause. In relying upon this law we rest our case on a foundation that cannot give way, and this will be so wherever our investigations take us, even in the attempt to prove the existence of God.

128. Our exposition has become somewhat extensive. So it might be good to emphasize, briefly, the principal ideas of it. The core of the proof of the law of universal causation is as follows:

The truth of the causal law is a result based on the concept of coming to be, which contains the concept of time and thus also the concept of continuity. And it is based, too, on the law of large numbers, according to which an infinite multiplication of examples must yield the most precise correspondence between the relative frequency of the various events and their relative probability.

So when there is a continuity of events, the equally possible physical opposites, if there are such, must completely balance each other out. And so it appears that the slightest alteration in any direction whatever is unthinkable, even for the briefest period of time, without some determining cause. And an infinitely small alteration, or one that lasts for an infinitely short period of time, is a physical impossibility.

129. I shouldn't be surprised if many of you, even though you've completely understood the inquiry pursued here and have been perfectly convinced by it, are still amazed that such means are required to give us a rational conviction of the universal validity of the causal law. The belief in it is so widespread that it is a dictum of so-called common sense. But how is the man of common sense supposed to rest his convictions on such subtle considerations?

The answer is, as Laplace has said it, that the precise pursuit of what the theory of probability requires quite often provides the justification for what so-called common sense maintains. But while the latter senses it instinctively, the exact demonstration is often bound up with more than minor difficulties. Nevertheless there is always a certain affinity between the two thought processes, despite all the disparity of precision. And so it is here. I've often been able to observe this when I've asked simple people, who are far removed from scientific analyses, whether something can come to be all by itself. Without exception they've immediately answered, No. And upon being asked further, why not, they come up with the counter question, "Then why wouldn't it have already come to be?" This question really hits the nail on the head.

130. Having convinced ourselves of the possibility of an analytical proof of the law of universal causation, we wish now to return to the considerations which led us into this analysis. We had raised the question of whether it is possible to establish a causal law as a fact on the basis of matters of fact.

In answering this question we distinguished between empirical causal laws (which are valid for the domain of experience), and causal laws of strict, universal validity such as is attributed to fundamental laws and to the theorems derived from them.

We came up with an affirmative answer with respect to empirical causal laws. With respect to the causal laws having universal validity we ran up against misgivings by which even the law of universal causation is not untouched. Now we have seen that it nevertheless does possess strict, universal validity. But we saw at the same time that this is the case only because it can be made known to us, not a posteriori, but rather *a priori.* So there remains the question that was raised before of whether any causal law having strict, unexceptionable validity can be set forth on the basis of matters of fact.

It seems to be difficult, and perhaps many are inclined to declare immediately that it is impossible. But here, as elsewhere, one mustn't be hasty. On closer inspection it does not appear to be inconceivable that certain determinations may with infinite probability be declared to have perfectly universal validity for the whole realm of things that exist.

If we ask, for example, whether poetry of the calibre of Shakespearian tragedy has come into being anywhere in the world, or ever will, without the direct or indirect influence of an intelligent being, anyone who heeds his own common sense will deny the possibility. Many similar examples can be furnished with reference to other products of the intellect. And it is possible on the basis of them to ascend to universal determinations of equally unexceptionable truth, which become all the more significant since they have validity quite apart from any knowledge of the universal causal law. For even if there is something that could come to be without a cause, or existed from eternity, still no one would believe that a copy of a Shakespearian tragedy has come to be without a cause or has accidentally existed from eternity.

But upon closer examination it becomes clear that the issue here is not precisely that of causal laws. And there is no absolute impossibility involved in a certain collocation being independent of intelligent operations. Rather, all that can be claimed is that an event which is relatively easy to explain, on the assumption that it has an intelligent cause, requires infinitely complicated hypotheses without this assumption. And so whenever such an event occurs it is to be traced back to a mind, with infinitely great probability, with "physical certainty."

131. In fact, we must leave the question undecided at this point. For more careful consideration reveals that an empirical proof of the causal law is conceivable only on one condition, namely, if we are able to acquire a rational conviction of the existence of a first, divine, and therefore universal principle of all reality.

Only such laws, that is, as involve some relation to the divine being can be pronounced strictly universal causal laws for the whole of creation, even if their foundations are empirical. Such laws would be, for example, that everything springs from a first cause, that everything has a purpose, that nothing will be annihilated, even though everything was created out of nothing, and so on. But at the outset we have no means of deciding such matters.

I will remark only that in connection with what I have just said there have been some paradoxical assertions made by our greatest philosophers, which those who have not delved very deeply into metaphysics tend to smile at. Thus Aristotle designated the existence of God the most certain of all truths, and Locke (here in agreement with Descartes) maintained that apart from our own existence the existence of no other being is so certain for us as is the that of a divine being.

But let this be mentioned only in passing here. In order to complete the picture of which matters of fact may be inferred on the basis of matters of fact, we must raise a couple of other questions and answer them briefly. First of all:

132. 6. *Is it possible, on the basis of other things or events, to infer that some thing, or event, is a cause or an effect, or in general that it is something required by a causal relation?*

Yes indeed. First of all generally, on the basis of the causal law; i.e. whenever anything comes to be something must be the cause of its coming to be.

In particular (sometimes with certainty, sometimes with probability) such inferences can be made on the basis of particular causal relations.

For example: Suppose there are two urns, and I know that one of them is filled with black balls and the other with white, but I don't know which is which. Which one am I standing in front of? The answer can be gotten by one trial. Not so, however, in the case of three urns if each contains two balls, one of them having two black ones inside it, the next having two white ones, and the third having one black and one white. I pick out a white ball. Which urn am I standing in front of? Answer: The chances are two to one that I'm in front of the urn with two white balls inside it, and likewise that I will pick a white one on the next draw.

More generally speaking, one assembles all the relevant hypotheses, determines their relative probabilities, and then one calculates from this the probability of a single event in relation to the sum of the probabilities of all the other events that are also possible.

Often the probability of one event infinitely outweighs that of all the others that are also possible. For example, that a watch has been made by a particular watchmaker (by a specialist or by a dabbler in watchmaking). Or that a page on which there is a German poem bears the influence of a person who knows the German language.

And the noteworthy formulae of induction, $(n+1)/(n+2)$ and $(n+1)/(n+m+2)$ are also connected with this point. They express the probability of an inference by analogy, the first when there is no prior evidence for or against, the second when not only the number of cases in which the event occurred (n) is known, but also the number of cases in which it failed to occur (*m*). For an explanation of this I must refer you to the investigations of the mathematicians, with the results of which common sense can celebrate a victory over Hume, insofar as he condemned the faith in experience as a superstition.

133. 7. *And now just one more question: Is it possible to infer that something transcendent is a cause?*

If we want to get clear on this, then above all we must recall to our attention what is meant by the transcendent. Those things are designated transcendent which cannot be objects of possible experience, in other words which are such that it is never possible to know them directly by perception. If we think of the way something may be inferred to be a cause, as we've just discussed this, then it is not obvious *a priori* that it shouldn't be possible to infer that something transcendent is a cause. Only two conditions need to be fulfilled for this to happen.

a) First of all, in order to conclude that something is a cause, one must have an idea of it.

b) Secondly, one's assumption must be an hypothesis which would explain an already established fact, and which has a probability infinitely surpassing that of all the other possible hypotheses.

It is immediately obvious concerning the first of these two conditions that it can be fulfilled with respect to a transcendent cause, too. We do have ideas of many things, the existence of which is not known to us by direct perception and never will be. So it is, for example, with all the things which the presentations of external sense reveal to us. To be sure, one does speak of external perception, but it doesn't deserve the name. The existence of an external world, as it appears to us, is far from being directly assured for us. So here we have ideas, intuitive ideas, of things that can never be known by direct experience.

Moreover, we can take these ideas, just as we do the ideas of the inner realm, and distinguish their elements by abstraction, and freely recombine them in many ways, and thus construct ideas of things that likewise cannot be called objects of possible experience, or are perhaps even further removed from possible experience than the initial ideas were. We are able in this way even to imagine contradictory things. Negations, comparative determinations, analogies and causal relations play an important role in the construction of such conglomerates. The ideas of things and events which we acquire in this way are mostly not intuitive, of course, and are often just substitutes for intuitive ideas. But no more than this is required in order to take up the inquiry into whether there exists anything corresponding to them.

134. The first condition, then, is certainly fulfilled in many ways. And if we look at the second, at least it is not evident *a priori* that among the wide variety of transcendent concepts, which we can acquire in the way

just noted, there is not to be found one that may serve as an explanatory hypothesis for a matter of fact already established by experience, if there is assumed to be something in reality which corresponds to the transcendent concept. Nor is it evident *a priori* that such a transcendent concept may not infinitely surpass the other possible hypotheses with respect to explanatory power.

And we actually do find this to be the case.

1. First of all, even the universal validity of the causal law involves an inference to transcendent objects as the causes of any coming to be that occurs in the world of experience.

For if I think of myself as the proximate cause of the objects of possible experience, still these require further causes, and so forth, and I would come to an infinite series, which might be unacceptable. But even assuming an infinite series is possible and provides a sufficient explanation, in any case, being infinite, it is not an object of possible experience.

2. Furthermore, the assumption of a three-dimensional external world is an hypothesis which makes our physical phenomena and their order understandable with infinitely greater probability than any other hypothesis does. It is the basis of all our natural science, and this basis would be lost if it appeared to be inadmissible due to being an inference to something transcendent.

The same would hold for the broader determinations of the physical world, according to which physical bodies are thought to be, for example, inert, heavy, etc.

3. Yet another instance of a perfectly warranted transcendent inference is the one which leads us to the assumption that there is some other psychological individuality besides our own, and that there are a number of distinct human mental lives. Likewise there is the inference to the existence of the mental lives of animals, by more remote analogy to our own. Descartes cast doubt on the existence of animal souls, but doubt here seems more risky than belief. We think of such animal mental life as being for the most part poorer than ours; but it could easily happen that we could be forced to regard it as in many respects richer, too. What stands in the way of the hypothesis, if it should prove necessary, that the aural range of certain animals extends farther than ours does, in the upper or lower range? And likewise, might they not see a wider variety of colors than we do, so that we would be related to them somewhat as the colorblind are to people with normal vision? Indeed, what stands in the way of the hypothesis, if it should prove necessary, that there is a sixth sense, just as someone totally blind or deaf from birth would be justified, after all he has experienced in dealing with other people, in hypothesizing a fifth sense, an idea of the nature of which he could form for himself,

though surely only imperfectly and imprecisely, by means of analogy, negation, comparative determinations and the like. Ernst Heinrich Weber suspected that there is such a sixth sense in doves, in order to explain to himself the fact that when some doves were taken from Halle to Leipzig in a closed cage they found their way back again. This would be a transcendent hypothesis, but one which under certain circumstances (though they may not obtain in this particular case) could be verified with physical certainty.

These are only examples, and not at all exhaustive. But each one of them suffices to establish beyond a doubt our contention that it is possible to reason with certainty to a transcendent cause.

105. Having denied that Hume's skeptical attack on inferences from one matter of fact to another is any more serious for our cause than the arguments of Kant, and having thereby established the logical justification of our inferences to transcendent causes, I would like finally to make one further observation.

Hume had pronounced a double anathema on transcendent causal inferences as being not only irrational, like all other causal inferences, but also *unnatural* since habits, which would otherwise be the motivation behind them, cannot be formed, on account of the absence of experience of transcendent things.

As I have said, the difference between ordinary causal inferences and transcendent ones would not be of any great importance. But in fact there is no difference here at all. Without being the logically justifying principle of these or any other inferences, the force of habit does often motivate us to draw conclusions in keeping with what logic would justify, even in the case of transcendent inferences. This is obviously the case

1. in general where one infers the presence of some cause that can't be designated more precisely, in which case the cause is negatively identified to be a transcendent one, since none of the empirical candidates will do.

One is also inclined to posit a cause because one is accustomed, whenever anything comes to be, to see that something else precedes it as its cause.

2. As we have seen, inferences by analogy often lead to a transcendent cause.

Indeed habit is a force which drives us not only to repeat earlier acts but also to practice similar ones. Thus, for example, someone who has developed a habit of losing his temper will find it easier to lose his temper not only over what has angered him many times already, but also over other things. And someone who has practiced telling jokes will not appear very clever at all if he's only inclined to repeat the old jokes and not to invent similar new ones, too.

In psychology the principles of the association of ideas are quite often stated inadequately when a law of contiguity and a law of similarity are spoken of as though the former pertained to the association of an idea already had and a presently recurring idea with which it was once simultaneous,and as though the latter pertained to the association of like ideas. It can happen that, by means of association, one acquires an idea *which one has never had before,* since one does associate similar ideas with similar ideas. Thus it is when one transposes a melody. And thus, too, habit often leads to the assumption of new causes, which, however, are analogous to those already discovered.

Now such a habitual inclination to make analogous assumptions manifests itself especially in the question of the existence of God. And it may have the result that the assumption that there is a God is more easily and widely disseminated than is the knowledge of his existence which is based on logically valid reasons, supposing such knowledge is available to the metaphysician as the result of careful observation of the facts and precise comparison of the probabilities involved.

5. Further Arguments of a General Sort Against the Possibility of Proving the Existence of God

136. The extended considerations of the validity of inferences from one matter of fact to another make it necessary to recall to our attention the connection between this subject and our larger task. We had to deal with arguments which purported to show that any attempt to prove God's existence is futile because it is known at the outset, if not that God does not exist (as many have maintained), at least that this is a subject which does not admit of certain knowledge on our part. We divided these arguments into two classes, the one including arguments of a general sort, the other those which are specially adapted to our subject. Until now we've been concerned with the first class. We briefly discussed *absolute skepticism,* which rejects every proof of God's existence as being impossible. Secondly, we discussed *mitigated skepticism,* according to which no subject admits of anything more than finite probability.

Having exploded these two theories without much difficulty, it became necessary to ward of an incomparably more important opponent, David Hume, with his *limited skepticism.* His view does not deny all certainty of judgment, but it does deny the logical justification of inferring one matter of fact on the basis of another, so that our empirical knowledge must remain limited to what can be perceived with direct evidence. This doctrine threatens to destroy every empirical science, and all of natural theology, too, since if God can be known at all it is only as a matter of fact inferred from other matters of fact.

As a fourth opponent we had in Kant one who, unlike Hume, did wish to save factual inferences with the help of his synthetic *a priori* cognitions. But he, too, ruled out the validity of any *transcendent* inference, that is, of any inference to something which is not an object of possible experience.

The analyses of the arguments of our two great opponents have occupied us longer than I had foreseen. Of the two it was primarily Hume who effected a reversal of popular opinion concerning the question of God's existence, but today it is still Kant who determines that opinion, being the most widely respected authority. So I do not regret the time we've spent on them if I have succeeded, as I hope I have, in giving you a full insight into the untenability of their theories, and in freeing you from the impression of the prejudices which weigh so heavily on our times.

But even now I will not move on to a quicker tempo, because haste makes waste, as an English saying goes. And in haste the possibility of a genuine conviction and of any real success would be lost.

So I mean first of all to complete the enumeration and examination of the arguments of a general sort, and show you that claims similar to those of Hume and Kant have been made in recent times and from different points of view.

137. Auguste Comte is reminiscent of Hume in that he also puts forth his renunciation of the proof of God's existence on the grounds that *causal investigations are altogether impossible.* His doctrine is essentially as follows:

At the beginning of the history of scientific endeavors, because the human mind did not yet know its limitations, we do find that people sought after the causes of occurrences. With time, however, they came to the deeper understanding--sooner in some areas and later in others--that there actually are no "explanations" in this sense. From then on scientists took this word to mean nothing more than the establishment of a connection between specific phenomena and several general facts,the number of which the progress of science continually diminishes.

As an illustration Comte suggests a look at the observational sciences. When they have made a certain degree of progress, they never claim to have presented the generative phenomena, not even when they have brought the explanation of nature to its highest perfection. For example, Newton's law of gravitation encompasses an immeasurable multitude of facts as specific cases of the general fact that two bodies (if nothing hinders them) will move toward each other with a speed that bears a direct relation to their masses and an inverse relation to the square of the distance between them. But this law does not tell us the *cause why* bodies attract one another, and every natural scientist rejects this question as unscientific. An earlier, primitive method of investigation might imagine it had found the reason for this, perhaps in some living impulse that dwells within the heavenly bodies, whether as the spirits of the spheres, which move them, or as a separate entity, "gravity." But this provides nothing but a naive repetition of the fact to be explained, and is no better than the "Virtus soporifica" with which Molière's wise doctor explains why morphine makes people fall asleep. Today physics is quite clear about the worthlessness of these causal investigations. But they must vanish from philosophy, too, and with them the old question about the *first* cause of all things.

138. This argument had a more profound influence than its logical weaknesses would lead one to expect. For it is easy to refute by calling attention to the two different possible meanings of the proposition, "The investigation of causes is impossible." It can mean:

1. It is impossible to know the inner nature of the causal principle in other words, it is impossible to *conceive* what it is to be caused.

Thus understood the proposition means something which is quite correct, namely, that our knowledge of the interaction of things is not perfect enough to give us an insight into why they interact in a given way under the given circumstances. This exhibits the difference that exists between the way we know a physical law and the way we know, for example, concerning the number four and the number two, why the one is and must be exactly twice the other. Here no "how and why" remains to be answered; the reason for their quantitative relation presents itself to us clearly in the concepts themselves. We do not marvel that the law is upheld uniformly and in all cases. We do not require experience, nor a series of inductions, in order to convince ourselves of its universal validity. Rather, it is evident to us *a priori* on the basis of the concepts. The situation is different, for example, in the cases of the so-called attraction of bodies. Here we have not likewise penetrated the inner reasons of things nor grasped what the cause is, and its very nature, in such a way as to be able to predict, independently of experience and on the basis of the concepts themselves, what the resulting phenomenon will be.

Thus understood, then, there is no objection to the proposition that causes are unknowable.

2. But it can be understood in a more far reaching sense, if it is maintained that what is unknowable is that the cause lies in one thing or another. And thus understood the proposition is false and no natural scientist would defend it. scientists do not believe it is impossible to know that when two bodies attract one another the cause of their so-called attraction is in them and in their respective positions at the time. When a moving body encounters a body at rest so that the latter begins to move and the former is slowed down, or even perhaps deflected or brought to a standstill, according to the mechanical laws of equality of action and reaction, the physicists do not doubt that there really are causes of the changes in the bodies that contact each other and in their preceding circumstances. No astronomer is afraid of saying that it is the sun and its position relative to the earth by which the movement of the earth is affected and made to deviate from a straight line, as experience shows us

it is. Likewise, no rational person doubts that his will effects the movement of his hand when he writes. Here we even have--in contrast to the earlier examples--a proper idea of what the cause is. All the same, the manner of causation remains inconceivable for us, as it was before.

139. It is easy to see the application of all this to the question of whether a first cause of the universe is knowable. One who says that the principle of the world and of its order is a rational being, in no way maintains thereby that with respect to the origin of the universe he has achieved the comprehensive insight which is denied to our minds in the case of less remote causes. He does not presume to understand the nature of God nor to be able to deduce from this the plan of the world and the world itself. But it may be possible, nevertheless, to prove, perhaps quite rigorously, that there is a God and that this God has produced the world.

So much, then, for this attack by Comte which, as has been said, sounds a bit like Hume though it is essentially different. That is, when Comte does away with the knowledge of causes, he does not go so far in his skepticism as to reject every inference from one matter of fact to another.

140. John Stuart Mill, in his *A. Comte and Positivism*, repudiated Comte's mistake. But he, too, considered a certain proof of God's existence to be impossible, on grounds of his general views on logic. And here one could say that he is to Kant as Comte is to Hume, because he also denies the possibility of any certain inference to a transcendent cause, although for reasons which differ considerably from Kant's.

That is to say, Mill is of the opinion that it is never possible to verify an hypothesis which would establish that some object has a specific nature. In order to prove an hypothesis with scientific exactness, he considered it necessary to show:

1. That we can deduce the known facts from the hypothesis;
2. that nothing else could provide the explanation we're after.

"Now it seems to me," says Mill, "that this second assurance cannot be achieved, if the cause posited by the hypothesis is unknown and merely thought up for the purposes of explaining the effect..."

"If a scientific hypothesis posits an unknown cause, the only practical result will be that it opens up a new line of inquiry, which could possibly lead to another (independently valid) proof."

Before America was discovered, people noticed that all kinds of strange objects washed ashore on the west coast of Africa. That suggested an unknown land lying to the west. It would have been a very uncertain assumption, though, that this land was America. The hypothesis wasn't verified until, stimulated by this idea, someone sailed out and discovered it. But before that even the coincidence of many other things that were in agreement with the hypothesis still would not have been sufficient for an exact proof of it.

For the same reason, Mill would say that even the theory of atoms and the hypothesis of ether are lacking such a proof. Comte would agree. Likewise, the physiologist Huxley, in his work on the cause of organic nature, demands a *vera causa*. Ulrici is of a similar opinion, and distinguishes, from the domain of knowledge,the unverifiable as the domain of belief, relegating the idea of God to the latter.

141. Nevertheless, this view is untenable and it would almost appear superfluous to dwell on the refutation of it here. For in the discussions to which we were led in order to answer Hume and Kant, we have already learned the true requirements of an exact proof, but we did not find Mill's requirements among them. Even the mathematicians do not mention them in their theories of the probability calculus.

Mill misunderstood the significance of the probability calculus in his otherwise praiseworthy logic.* He even misconstrued the relation between mathematics and induction, since he tried to base all of mathematics on induction, whereas really any inductive inference requires mathematical considerations for an assessment of its validity. And it is certainly because of these mistakes that he could make mistakes also in listing the requirements of an exact proof. However, out of respect for the stature of Mill and of the other thinkers we've mentioned, let us spend a few more moments in examining his view.

Mill says that in his opinion an hypothesis which posits the specific nature of an object can never be established except by a subsequent proof based on direct experience. This raises the question, first of all, of how far this restriction extends. In many cases we posit *individual* objects when we know nothing about them except through other individuals of a similar kind. Thus, for example, Vulcan was discovered with the help of our knowledge of the moon, and in a similar way Leverrier discovered Neptune. Should Mill be suspicious of these discoveries? Hardly! And if he were he would surely be mistaken. In fact these hypotheses have been proved with the utmost rigor. And likewise we also posit new *species* and genera, for example, in order to explain newly discovered mammoth bones and other prehistoric animal and plant remains or their fossils. Likewise new chemical elements are posited, and even when they cannot be purely isolated for many years no chemist continues to doubt their existence. It suffices that Bunsen's spectral analysis has led to their discovery. Discovery, that is, not pure isolation. For it is not the new element itself that is directly discovered, but rather an appearance in a spectrum, an effect which leads us to a new kind of element as its cause.

Now if all these discoveries are made with certainty, where do we draw the line on the kinds of hypotheses that can be verified and on the means of verifying them? There seems to be no good reason to impose any such restrictions. And this conclusion agrees with our earlier discussions concerning transcendent causes. It is granted, too, by philosophers who are otherwise extreme empiricists like Mill--for example, by his friend Alexander Bain.

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* The same may be said of the other philosophers just mentioned.

142. An excerpt from Helmholtz's essay on Goethe's work in the natural sciences may serve as a witness to the thoughts of natural scientists on this subject.

> "[Goethe is of the opinion] that nature must reveal its own secrets, that she is the transparent representation of her own ideal content. For this reason he requires... that one observed fact always explain another, so that one may come to have an insight into their connection without ever leaving the domain of sense perception. But this requirement... is fundamentally and essentially mistaken. For a natural phenomenon only has a complete, physical explanation when it has been traced back to the ultimately operative natural forces which underlie it. Because we never perceive these forces in themselves, but rather only their effects, it is necessary in every explanation of natural phenomena for us to leave behind the realm of sense and turn to things which are imperceptible and defined only by concepts." [Goethe would like to see the physicists approach nature the way poets do, rendering any intellectual content in sensual imagery.] "The physicist, on the other hand, means to lead him into a world of invisible atoms, movements, attracting and repelling forces... " etc.

We can see that Mill's opinion--which, by the way, he put forth only as a modest suggestion--is rejected by recognized authorities, as we have rejected it, and in even more decisive terms. Along with these authorities we will declare that Mill's requirement, that every other hypothesis must first be ruled out, is not unjustified. Rather, it is easily fulfilled, and at that, without the aid of a *vera causa* in his sense. His other requirement, the one he puts first, namely, that we must be able to deduce the known facts from the hypothesis, seems to me, on the other hand, to be less essential. We could possibly trace a given picture back to a certain artist as its producer, without being in any position, on the basis of an acquaintance with the master, to deduce that some painting or other is his work.

B. SKEPTICAL ARGUMENTS WHICH ARE SPECIALLY ADAPTED TO OUR SUBJECT

143. Let us turn to the second class of opposing arguments, to those which are specially adapted to our subject. At the outset, they do not appear to be nearly as serious as the skeptical arguments of a general sort. If we are to leave no stone unturned, we mustn't overlook anything, but some things we can deal with quickly.

I. The existence of God cannot be proved, because a proof is *knowledge based on reasons*. But there is no reason, other than the existence of God, for the existence of God, since if there is a God then it is rather in the truth itself of this fact that the reasons are to be found for the truth of the existence of all other beings. So by his very nature God rules out the possibility of a proof of his existence. It can only be known directly, something which we showed to be impossible for us in our earlier discussions. But in any case, it cannot be proved.

Reply: That is an argument with which Spinoza might agree, because it is for this reason that he says in his *Ethics* that the ontological argument is the only valid proof of God's existence. But this view is false and easy to refute.

All that is required is a simple, clear distinction between the reason why something is true in itself and the reason why something is true for us, i.e., the reason by virtue of which we subjectively come to know some truth. (The ground of being and the ground of knowledge.)

The grounds for a thing's being are the causes of its effects, and one can say, speaking loosely, that the grounds of existence are the higher principles of the theorems derivable from them. (For example, the laws of inertia and gravitation are the higher principles of the laws of the acceleration in the velocity of falling bodies.) The grounds of knowledge can even be the effects of causes, and again one can say, speaking loosely, that derived laws are the grounds of the knowledge of higher ones, if the former are known by perception and induction, and the latter are required as their necessary presuppositions. Often this is the only way of inquiry open to us, and the order of prior and subsequent truth with respect to us is just the opposite of the order of prior and subsequent truth in itself. Aristotle often pointed this out. Moreover it was he who gave rise to the mistake this argument makes, because for him the word "knowledge" has a different meaning from what it does for us, and also for him the word "proof" has a double sense. By knowledge we often understand every act of knowing something with certainty, but by επιστήμη he understands only the act of knowing a universal and necessary truth, which is derived from higher, and ultimately, from the genuinely highest first principles. So according to him one does not have "knowledge" of what one perceives with evidence, no more of an axiom--but one does have knowledge of a theorem derived from fundamental principles. The word απόδειξις, however,has a double meaning for him. Sometimes he uses it for any indirect act of knowing, for any certain conclusion; but other times he uses it in a narrower sense, only for a conclusion deducing and explaining the dependent truth of the existence of something on the basis of its first principles. In this narrower sense, then, a proof is an act of knowing based on reasons, in other words, a conclusion that leads to "knowledge" in the sense just noted.

Such an apodictic (deductive) or scientific (epistemological) proof, in the narrower sense, is possible only for derived, secondary truths. And so it cannot be used for the existence of God. But this does not entail that his existence is never to be arrived at by any inference, nor that it cannot be known in our *present* sense of "know." Since the objection confounds the two senses of knowledge, it is guilty of a paralogism by equivocation. By means of a deduction from higher, determinative truths it denies the possibility of any deductive procedure or indirect act of knowing whatsoever.

144. II. There is a second argument, just as easy to refute as the first was, to which we turn now.

If we want to infer the existence of God on the basis of matters of fact, then we must appeal to certain universal laws, e.g., the law of universal causation, and to this end we have been careful to show this law to be evident and analytic. But even if this law and others can be shown to be evident and analytic, it strikes many that when it comes to the existence of God these laws do not provide a suitable basis for proof. In fact they hold that God's existence cannot be proved, because none of our laws could be valid for God, not even the analytic ones, indeed, not even the law of non-contradiction. They say God, as the absolutely free, independent, infinite being, must be above all laws. So we mustn't think of him as being subject to the laws of causality and non-contradiction either.

But if this is true, then it means the end of all speculation about God. For not only is it impossible to be led to accept God's existence except by faith in the causal law, but also, in the absence of the law of non-contradiction it is impossible to say anything which is always true and certain of him and his existence, without being afraid that what we say is false at the same time, and that we are in error. Thus the sublimity of God makes any certain proof of his existence impossible.

(According to a verbal report by Stumpf, Lotze made use of this argument.)

145. *Solution of the difficulty*: 1. This objection, too, amounts to nothing and is scarcely more difficult to refute than the first. It is maintained that the existence of God cannot be proved because when it comes to God none of our most evident laws are valid, not even the analytic ones. But this contention is obviously absurd. Whatever is evident in the way an analytic proposition is evident is true, and true in the sense that it is evident on the basis of the relevant concepts. It will not do, then, to distinguish cases in which such a proposition is true and others in which it is not true. Such a limitation involves an alteration in the sense of truth. And so it is absolutely to be denied that the law of non-contradiction or other analytic laws, be they directly or indirectly evident

to us, ever undergo a limitation of their applicability and, e.g., in an inquiry into the nature of God, appear to be unreliable.

When a significant thinker like Lotze fails to understand this, it may be due to a bad after-effect of Kantian philosophy. Kant allowed himself to speak of synthetic *a priori* cognitions and then to ask where they are valid and where they are not. Obviously others went further in the wrong direction, and eventually they didn't even hesitate to apply the same procedure to analytic propositions. But as we have seen, the truth is rather that even Kant's restriction is logically objectionable.*

If the unexceptionable universality of such analytically evident laws as the law of causality or of non-contradiction really were incompatible with the sublimity of God, then the conclusion would not be that the laws have only limited validity, but rather that such a sublime being, as we imagine God to be, does not exist. The argument would be different, then, and would belong not to this but to the previous class of arguments, which protest against the attempt to prove God's existence because it is possible to know *a priori* that there is no God.

2. But even with this change, the argument would gain nothing in terms of plausibility. For it is only as a result of confusing concepts that one could come to believe that the freedom and perfection of God would suffer any damage if the analytic laws of causality, non-contradiction, and so forth, were valid for God just as they are for us.

Of course, God's dignity and freedom rule out the possibility that there exists a being which has the right to command God, or which has the power to compel or to restrain him and thus, legitimately or illegitimately, to lay down laws for him. But that there could exist such a being is not at all maintained by one who holds that the laws of non-contradiction, and the like, have unalterable, unexceptionable validity even for God. For these are not laws in the sense of commandments or constraints, stemming from the will of another being--which have just been called inconsistent with divine dignity and freedom. Rather they are laws in the sense of necessary truths, which are just as independent of the divine will as they are of any one else's.

3. Perhaps someone will say: But that something should be necessary without having been determined to be necessary by God's will is also inconsistent with his perfection.

But this is so far from being true that in fact the perfection of God involves the opposite. For God's perfection requires that he be necessary, but obviously not "necessary as a result of his will," rather it requires that he be absolutely necessary. (Baader's talk about God's eternal self-generation and self-rejuvenatlon is nonsense.)

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* Although Kant was probably responsible for Lotze's mistake, as has been said, it should be remembered that Descartes, too, made a similar mistake when he said that God could make the radii of a circle unequal to each other. Some nominalists aside, the philosophers of antiquity and the middle ages are strangers to this error.

146. *Objection*: Nevertheless there might be someone who is still not satisfied with this. God's necessity is one thing but the necessity of other things is something else again. God himself may be absolutely necessary, independently of the divine will, without the perfection of God being compromised. But as for what is necessary apart from God, it can exist only as the result of his will, otherwise it would appear that God is not the original source of everything that is. But concerning the analytical laws it was supposed to be the case,

a) that they *are* (though not things, they are non-things and yet genuinely existing entities) without being dependent upon God's will and creative activity. A real triangle, if there is one anywhere in the world, is made by God, if there is a God. But the same cannot be said of the truth that every triangle must have three angles, nor of the impossibility of there being a circle with unequal radii. This truth, and this impossibility, exist without being dependent upon God in any way. (Just as they are independent of the existence of any real thing, even of the existence of a triangle and a circle, respectively.)

b) But if such necessities and impossibilities exist independently of God, then they set unmistakable limits on his omnipotence. He would have to forego willing what is contradictory, since it just wouldn't happen.

Reply: Certainly what is contradictory would not happen, even if God willed it--but the supposition that he would will it is just as absurd as the existence of a contradiction, and it shows no imperfection in God if he cannot will such things. But all that is being said is that God cannot will an absurdity, and that his omnipotence cannot take hostile action against itself. For this would be the case if he willed that the same thing be and not be. Just as it is not a barrier to his perfection that he hasn't any possibility of being imperfect, so it is not a barrier to his perfection that he cannot will what is senseless or wicked. I add "wicked" because the ethical laws are as valid as the logical ones are. When Leibniz says that God cannot will anything but the best, he is not saying something that contradicts God's perfection.

Regarding the objection that such laws, i.e., such analytic necessities or impossibilities, though not exactly to be regarded as things independent of God, are nevertheless on our view entities independent of him, this is an entirely unjustified objection. For what is at issue here is not at all something that exists in the strict sense. Rather it is to be remembered that someone who allows the impossibility, or possibility, or non-existence of something to be called something which is, someone who says that these exist, is really only saying that one would judge correctly who apodictically denied a certain thing, or who judged that something actually is not present, or who judged that someone else in apodictically denying a thing is mistaken. For this very reason Aristotle eliminated this use of the word "being" (in the sense of ον ως αληθὲς) as having no place in metaphysics. Clearly the present objection is due to a linguistic fallacy which Aristotle already knew how to avoid. There are those who speak of laws, of possibilities and impossibilities, as though they existed, and thus they take them to be things which exist. But they make the same mistake as one who, making a headcount of his loved ones and finding one missing, thereby thinks to have made a *positive* determination, a recognition of X's failure to be present, or even, of the presence of X's failure to be present.[22]

147. Finally, one more objection might arise: If God cannot cause what contradicts analytic laws, this still means a limitation of his power. For not only can he not create what is contradictory, he also cannot create what is physically impossible (such as a green thing which is red). But this must immobilize his will when it is directed toward the most perfect creations. For everything which is limited by physical possibility has its peculiar advantage, and only by uniting all these advantages could the most perfect creation be achieved.

Reply:

a) The world, the work of God, contains many things. And characteristics which are incompatible with each other in one and the same part of his work can be actualized next to each other, in different parts, such that in the whole they sum up to a higher perfection.

b) A higher analogue is conceivable, too, which is unified and of such perfection as to be the equivalent of the diverse, mutually incompatible perfections.

c) Besides, it has already been said that the infinite perfection and power of God do not require that he be able to produce an infinitely perfect creation, but rather only one which is infinitely perfectible.

d) It is not through his creation but through himself that he is abundant and blessed.

148. III. If a proof of the existence of God were possible, it would be a proof *a posteriori*, an inference that God is the cause which explains certain facts of experience. But such a proof must already appear to be unjustified because it explains external facts *by analogy to our inner experience.* As Comte and others have said, this is obviously reminiscent of the first, childlike stage of science. The earliest thinkers naively believed that everything is alive, as our children still do today. Scientific observation began as hylozoism. But after a time it was noticed that it

was impossible to be completely thorough in attributing souls to everything, and so the vitalistic view retreated somewhat. Universal fetishism was changed into polytheism. A whole area was referred to one being as its domain. But the retreat did not stop here. From polytheism people went to theism, which is thus to be regarded as the last remnant of a naive hypothesis. Therefore it is not to be taken seriously by science, instead it ought to be completely done away with in the end.

Reply: It is not to be denied that the theistic hypothesis is, in many respects, an explanation by analogy to our own minds. But not every analogy is objectionable. It is possible for an inference by analogy to be a perfectly flawless inference, an infinitely probable one--or else it may pave the way for such an inference. In fact we make all, or most, hypotheses by analogy, and this is what recommends them to us at first. (Mill)

So why should the analogy to our own minds be singled out as nowhere and never justified? Actually it leads to infinite probability in many cases. Whenever we attribute powers and operative causes to the external world we acquire these concepts from our inner experience. This is even more clearly the case when we suppose that there are sensations, affections, and voluntary movements in animals, and in our fellow men. So one who is guided by analogies is not on that account to be condemned out of hand. Rather you first have to examine the basis he has for his conclusion.

149. With regard to the history of the theistic hypothesis, and of its origins, which are not unobjectionable from a logical point of view, it may be that these historical observations are correct. At least, the evidence is favorable. What the history of mankind shows us on a grand scale is shown also by the history of philosophy on a reduced scale. I'm thinking here especially of Greek philosophy. Its founder, Thales, was a hylozoist. According to him everything is essentially water, and this water is alive. The All, he says in this connection, is full of gods; and he attributed a soul to the magnet because it attracts iron. In Empedocles this hylozoism is replaced by a kind of polytheism, and after him there comes the theism of Anaxagoras. Analogously, most backward people are fetishists, those who have progressed somewhat more are polytheists, and the theists are at the vanguard of humanity. (I am well aware that Max Müller won't concede this and prefers to regard fetishism as a corruption of a primitive theism. But the trend on this reading, too, is unmistakable.) Granting that the course of history really was as we've presented it here, it still seems to me that nothing can be inferred from it against the truth of the theistic hypothesis, nor even against the possibility of proving it.

If at first only a weak basis in probability speaks for a proposition why should this rule out a later, more powerful method of proof? The story is told about Newton, that it was by an apple falling out of a tree that he was led to the question of whether it would also have fallen if it had been hanging much higher, or as high as the moon, and why the moon doesn't fall to the earth, and thus he came to think of his law of gravitation. If the anecdote is true, still it doesn't cast doubt on the law which has its origin in this flash of inspiration.

Indeed, even if at first it is entirely incorrect reasons which have led to an hypothesis, it can become scientifically unobjectionable all the same. Why should it bother chemists of the atomistic persuasion to remember that Democritus, who first introduced this hypothesis, argued for it in a very misguided way? He appealed to the increasing difficulty of breaking a staff into ever smaller and smaller pieces, which actually has nothing to do with the indispensability of indivisible entities, but rather concerns the principles of leverage.

Also, the fact that an hypothesis has first appeared in connection with certain mistakes does not entail that it must arouse suspicions as to its truth. Mistaken hypotheses are often the forerunners of correct ones, and not uncommonly already contain a part of the truth. (A famous example is the emission theory of light as a forerunner of the wave theory.) If one hypothesis is the remnant of an earlier one, then, perhaps it is exactly what remains and persists that constitutes the kernel of truth in the earlier hypothesis. Who would want to throw out the hypothesis that animals have sensations on the grounds that it is a remnant of the hylozoism which saw life in everything? Even Comte didn't do so, rather he spoke of Descartes' theory of automata as a "noteworthy mistake."

Neither can anyone reject the theistic hypothesis on the grounds that it is a remnant of hylozoism. Besides, viewed correctly,that's not what it is at all. For God, as he is understood by Descartes, Leibniz, or Kant does not belong to the dogma of fetishism and polytheism. So the theistic hypothesis might better be regarded as one for which the mistaken hypotheses paved the way, and to which it is somehow related, though perhaps it differs from them in being correct and provable.

150. IV. If the existence of God were provable with certainty, it wouldn't be with mathematical but rather with physical certainty,which is actually called infinite probability. The most important questions of metaphysics admit only of this kind of proof, so that the expression "metaphysically certain," which many use for the analytic proofs of the mathematicians, is badly chosen.

The laws and facts, on which the attempts to prove God's existence rest, are for the most part knowable only with physical certainty. Thus it is with the existence of the external world; the most reliable memories; indeed the fact of memory itself.

Now these things are to be granted. But they cast no shadow on our enterprise, since physical certainty is the equivalent of mathematical certainty, and we are logically justified in this conclusion.

However--and this is the objection now--even a physically certain proof is ruled out in this case by the nature of the subject, and therefore the existence of God cannot really be strictly proved. And why is a proof ruled out? Let us hear the reasons:

151. The probability of an hypothesis with which we mean to explain a fact depends on two things:

1. On the ease with which it explains the fact, compared with other hypotheses;
2. and on the so-called unconditional probability of the hypothesis.

To illustrate this difference, here is an example from ordinary life: A child, sitting in his highchair, is playing with his clown doll. No sooner have I left the room than I hear him screaming and crying. Why? Diverse hypotheses present themselves. Perhaps it is because I have left him alone--but he's never been quite this upset about that. Perhaps his toy fell on the floor; in such cases he has usually begun to scream. But perhaps it is rather that the chimney-sweep has passed by and stuck his sooty face in the window. Then he certainly would have screamed with fright. Naturally one could think of still other explanations. But how am I to discover the most probable from among them, or from among these three? I have two factors to pay attention to in this:

1. How easy it is to explain the fact on the given assumption. In this respect the third hypothesis has the advantage over the other two, and the first has the least to offer. But this doesn't make the chimney-sweep hypothesis the most probable, because we must also consider
2. the difference in the unconditional probabilities. In this the third hypothesis is far inferior to the others, since it will happen very rarely that a chimney-sweep leans his ladder up against a house in which he has no business and peers through the window.

But I must take both differences into account, and then it may be that the second hypothesis will turn out to be the most probable.

This ordinary example may suffice for illustration here. In logic the subject is discussed in greater detail and the precise relation of the probabilities is established. It has to do with Laplace's sixth principle: The probability of a given effect is equal to the unconditional probability of the cause multiplied by the probability that the cause, if it existed, would have produced the effect.

With the support of this logical law it is maintained, as has been said, that a physically certain proof of the existence of God is ruled out by the nature of the object. For it is said that the existence of God is not a minor, ordinary hypothesis like other hypotheses; rather it involves at the outset, in itself, an infinite improbability.

a) Not only is the hypothesis unexampled, as has already been noted (this makes it suspicious already, since even for Newton's law there was significant support in the fact that the assured fact of the earth's gravity could be made use of), but rather there also exists

b) an enormous, indeed, an infinite discrepancy between the being which is assumed here and all those given in experience and knowledge. It is not supposed to have anything in common with any of them, nor is it subject to any of the laws which govern the beings known to us, not even to the most universal laws.

The more universal a law is, say the logicians, the less believable is an exception. And common sense agrees with this. For the man of common sense would have difficulty believing that someone had seen a white crow, because this would be an exception to the empirical law according to which all crows are black. But he would find it a good deal less believable that a crow had been seen which constituted an exception with regard to a universally accepted characteristic of birds, or of animals, or of living things, or even of all physical entities. (A crow with which one could have a philosophical discussion, a crow that wasn't impenetrable so that it flew through the sides of a very closely-wired cage. One would sooner believe that he had seen 100 white crows,and blue nightingales and green storks, too.)

So the assumption of a being like God, which would constitute an exception even to such universal laws, presents itself at the outset as an assumption more difficult to accept than any other, and infinitely improbable.

c) But with this we still have not said all that is to be said in order to show the dimensions of the unconditional improbability of such an hypothesis. It can be shown from a third point of view, too. Let us consider somewhat more closely the concept which we connect with the name, "God." Some say it means an *ens realissimum*, others say it means an infinitely perfect being. Either way it is construed, it signifies something infinite. There is supposed to be in God not just some reality, but all realities, not just some perfection but all perfections, infinitely augmented. Thus the assumption that there is a God includes an infinite number of assumptions concerning his power. The assumption is not a simple one, it is complicated, indeed it includes an infinite complication. But as logic teaches us, with every complication the unconditional probability of an hypothesis is diminished. And so the ratio which expresses the unconditional probability of an hypothesis that is made up of several assumptions is equal to the product of the probabilities of the individual assumptions. Thus, for example, the unconditional probability that one will roll a 6 with each of three separate dice = $(1/6)^3$ = 1/216. With eight dice the unconditional probability is smaller than one in a million, with sixteen less than one in a trillion, with twenty-four less than one in a quintillion. And here again, ordinary common sense will say the same thing, though less precisely. Thus Cicero said it is absolutely unbelievable that a random scattering of letters should have resulted in the text of the *Iliad.*

What shall we say, then, about an hypothesis which attributes infinitely many realities and perfections, of outstanding proportions, to one being? The unconditional probability here is the product of infinitely many ratios, and if we assume each of them to be 1/2, it would amount to $(1/2)^{\infty}$--an excess of infinite improbability.

And this doesn't seem to go nearly far enough, since it can hardly be said of the infinite augmentation, the excessiveness, attributed to every single one of God's perfections that the assumption that it is realized has unconditional probability equal to that of the assumption that it is not. So in place of 1/2 we may even put an infinitely small ratio. And thus we would get an infinitely small ratio raised to the infinite power, an infinitely small quantity of the highest order, as the unconditional probability of the hypothesis that God exists.

But its infinite unconditional probability is enough to show that a proof of God's existence can never be produced with physical certainty. For it may be that the hypothesis which assumes the existence of God provides a much easier, indeed an infinitely easier, explanation of certain facts we encounter in our observation and experience (e.g., the purposefulness that we find in organisms is much more easily explained by the rational activity of God than by the mere blind interactions of matter). However, the intrinsic, unconditional probability of the hypothesis would outweigh this advantage. So there can be no proof of it, and least of all a perfectly precise, physically certain proof.

152. *Solution of the difficulty*: Though I don't mean to underestimate the significance of other objections, some of which we've already touched upon and others of which we will, the objection raised here may well be the most effective in moving many to doubt the possibility of a precise proof of God's existence, even those who haven't considered such an exact formulation of it. But here, as elsewhere, the exact version of an objection is the best preparation for a reply.

The argument rests, on the one hand, on a general logical theory, and on the other hand, on an analysis of our special case.

1. In the first regard, it claims that in ascertaining the probability of an hypothesis one must consider not only the ease with which it explains the given facts, but also the so-called unconditional probability. Thus far the argument is entirely correct.

However, it is no longer to be consented to when it concludes that an hypothesis must be thrown out from the beginning, or regarded as one that cannot be established with physical certainty, if it has infinite unconditional improbability, or is made up of a variety of assumptions each having an infinitely small probability. This is not at all to be granted. Rather a hypothetically assumed law, or a hypothetically assumed cause, can be infinitely improbable in itself, and yet be made infinitely probable by the facts it serves to explain, and thus be proved with physical certainty. For it could happen, e.g., when there is a limited number of possible hypotheses, that one hypothesis is infinitely more probable than any other, whether in itself, or due to the ease with which it explains the facts. Let us imagine there are only three possible hypotheses, A, B, and C. Each of them is made up of *n* assumptions, each of which has the same infinitely small ratio as the expression of its probability.

But if one of the three were to explain the given fact infinitely more easily than either of the others, it would be physically certain, just as it would if the unconditional probabilities were of an equal, finite degree. This is in keeping with a principle of probability calculus, which Laplace gives as follows:

> The probability of any one of the conceivable causes of an observed event is a ratio, the numerator of which is the probability of the event's occurring given that cause, multiplied by the unconditional probability of the cause, and the denominator of which is the sum of the products of the probabilities of the events occurring, given each of the conceivable causes, multiplied by the unconditional probability of the relevant cause.

Naturally one must be careful in applying this formula when infinitely small probabilities are dealt with, so that some which really do balance each other out will do so in the calculation, and the result will be reliable,whether it yields a definite finite or an infinite probability in favor of one hypothesis. If one proceeds correctly, however, there remains no doubt as to the greater probability, or even physical certainty, as the case may be. In one of his essays, in the chapter entitled, "The Application of Probability Calculus in Natural Science," Laplace says that every natural law, even the simplest, is always infinitely improbable at the outset, in view of the infinite number of others that could obtain in nature. Nevertheless, many are strictly proved. And so our opponents' argument is not solidly grounded at all, as far as the general logical principle is concerned.

153. 2. They have also tried to cast the unconditional probability of the hypothesis that God exists in a particularly unfavorable light. The infinite improbabilities are supposed to be infinitely multiplied in this case. If that were true, it certainly would allow our doubts to return. But we will not grant this part of the argument either, without having carefully examined the reasons offered for it.

Three reasons are advanced for the infinite improbability of the theistic hypothesis:

a) The first is that there is not to be found in our experience an example of the kind of being this hypothesis assumes.

Of course, this is a circumstance which can make an hypothesis very improbable, but it is only significant insofar as it is probable that we would have encountered an example of such a being if it did exist. (Are there red-skinned human beings? If someone who has never ventured out of his village has never met with one, it doesn't mean very much. The situation is different if a world traveller has never come across one anywhere.) If a blind man argues against the existence of colors, his words carry no weight since he can't have experienced any. But so it is in this case. Suppose there is a God--in any event he isn't perceptible, nor can he be sensed, nor does he appear in inner experience which can only show us our own selves.

b) The second reason advanced is the infinite disparity there would be between such a being and all that experience shows us.

This isn't a valid reason either; that is, why should there not exist a being whose divergence from our experience is quite significant? Of course, it is said that according to logic the more general a law is the less believable an exception will appear. That is true, but it doesn't affect us here. For this principle should be understood as follows: Given a thing, of a certain species, which up until now has exhibited a certain characteristic without exception, it will be harder to believe that it dispenses with the characteristic if it is not only the species but also the genus, or even a higher class, which has exhibited this characteristic without exception. (It is, so to speak, easier to deviate from a species than from a genus.) The example of the white, or educated, or non-impenetrable crow is relevant here. And it also shows that this principle is not at all applicable to our case.

According to many, the reason would be that God doesn't fall under any of our concepts. Thus he doesn't belong to any species and therefore does not constitute an exception to the characteristics of any species.

We have rejected this view of so-called negative theology above (Section 51). But it is to be granted that God exists by himself in his peculiarity, if he alone is directly necessary. So he could be called an "exception" among things which think and exist.

But he is not the kind of exception which the objection requires, i.e., an exception in the sense of one isolated deviation together with innumerable conforming features.[23]

With this the objection seems to be refuted, but there remains yet another.

Objection: All scientists regard those hypotheses as more plausible which are analogous to the known facts and laws, for which reason hypotheses are never wholly original but are always modelled on what is known.

Reply: Of course, this is true, and the reason for it is that, as far as experience reaches, nothing presents itself which wouldn't be somehow analogous to other objects of experience. This is why it is probable that what holds for one thing will hold for other things accessible to experience. But this doesn't hold outside the bounds of experience. Mill himself, who advocated this logical principle, believed he had to concede that we cannot deny the possibility that many of our most general laws have no validity for bodies in other galaxies. Indeed he goes so far as to say perhaps this is so of the law of universal causation, which, as we have seen, he incorrectly held to be merely an empirical law. All the more reason to think his inductive principle might not hold when it comes to the theistic hypothesis.

154. c) The third reason advanced is the infinite complication of the theistic hypothesis.

Whoever assumes there is an *ens realissimum*, or an infinitely perfect being, heaps together in one being an infinitude of perfections, each infinitely augmented. So his assumption actually consists in many assumptions, and the hypothesis appears to be infinitely complicated. But the less simple an hypothesis is, the less probable it is. This principle is more precisely stated in logic when it is said that the total probability equals the product of the individual probabilities, which in our case is infinitely small.

Reply: This principle is correct. But is it applicable to our case?

α. We have already rejected the idea that the concept of God coincides with that of an *ens realissimum*. If we really think of God as the union of all conceivable, real determinations, then we must be thinking of the union of what is incompatible. Our reply could have reference to this criticism, and thereby point out that the proper concept of God, far from being so infinitely complicated, is rather to be thought simple, so that the theistic hypothesis itself assumes something absolutely simple and therefore cannot be regarded as a complicated hypothesis. But in answer to this someone could express reservations in connection with the fact that we have also indicated that our idea of God is imperfect in the highest degree. Now the claim of simplicity is added to the other unknown determinations perhaps in contradiction with them, but at least as something new which could be viewed as a complication.

β. However, we might come closer to a solution of the difficulty if we get clear on the sense of the principle upon which it rests. What is to be understood by a compound hypothesis?--A hypothesis which makes a number of assumptions? All right, but this doesn't tell the whole story.

An hypothesis is only to be called complicated when it makes a number of mutually independent assumptions, such that one does not proceed from another, and one is not necessarily contained in another. Someone who posits a triangle, the sum of the angles of which is 2R, makes no more complicated an assumption than someone one who simply posits a triangle. On the other hand, a defendant hoping to lie his way out of the charge and finding himself forced into a corner so that he tries to save his fabrications with further fabrications, is offering complicated hypotheses to the judge. In the case of the triangles, the partial assumption is necessarily given with the whole, but here it is added as something independent.

Now wherein is the infinite complication of the theistic hypothesis supposed to consist? Let us just assume, in order to oblige our opponent, that infinitely many perfections, infinitely augmented, are attributed to God.

In the "infinitely many," at least, there would be no complication, since the assumption that any finite perfection is found to be manifested infinitely in God leads directly to the same assumption for every other finite perfection. Within a finitely perfect genus, no infinitely perfect individual is possible. An infinite perfection which is merely an ideal of extension or of thought is impossible. But it is equally unthinkable that there should be an infinite perfection belonging to two genera to the exclusion of the others. It pertains to the concept of the infinitely perfect being to transcend the bounds, not only of every species, but of every genus.[24]

The most that can be said, then, is that the infinite complication lies in the infinite augmentation of *one* perfection. But even this would be unjustified. Augmentation in itself is not a complication here or anywhere else. It is no harder to accept a body moving at a speed of a mile per minute than one moving at a speed of a foot per minute or weighing many hundreds of pounds rather than a few, or having a diameter of many thousands of miles rather than an inch. It had been thought that this is not so, as we can tell, for example, from the fact that Aristotle rejected Empedocles' view, according to which even light transmission takes time, but happens so quickly as to go unnoticed, because for Aristotle this would be a μέγα αἴτημα. Indeed, when the Darwinians posit immense periods in order to allow time for the enormous achievements of the struggle for existence, this assumption is no more improbable, *a priori*, than a more modest estimate. Otherwise, the smaller one imagined a body the more probable would be the assumption that it exists, whereas, quite the contrary, minuteness below a certain degree is something which astonishes us, e.g. the minuteness of microscopic forms of life. Why?--because it goes against our customary experience. We make such experience the standard here, and where it is inapplicable immenseness and minuteness make no difference at all. An example will make this quite clear. Even if the assumption that there exists a physical, external world can be regarded as a safe assumption, still we are in no position to specify the absolute size of individual things. Now of the infinitely many possible hypotheses which one could suggest, though it would be futile to do so, are we supposed to think that they are more probable the smaller the dimensions they posit? That's ridiculous. Rather they're all equally probable, because no standard is given in experience.

So it is clear that an infinite unconditional improbability of God's existence cannot be inferred on this basis, nor on the basis of any of the other reasons cited so far.

155. 3. The complete triumph over our opponents requires one more thing, namely, the demonstration that the unconditional probability of God's existence is not so overwhelmingly small. We must show that God's existence is not improbable, that it is in fact more probable than a thousand other hypotheses, whose unconditional improbability doesn't rule them out altogether.

We will now attempt this demonstration. That is, I believe I can show that the unconditional probability of the theistic hypothesis is 1/2, because initially just as much--or if someone prefers, just as little--speaks for the hypothesis as against it.

Let us ask, first of all, what provides us with grounds for taking one side or the other. Experience? But the object here is unique in that we have no experience of it. What else will provide such grounds, then, if not the concept? And in fact a concept often gives us a clue and a means of judging not only the possibility or impossibility but also the probability of an hypothesis. Thus the concept gives clues, for example, in its degree of complication, or by showing that the hypothesis posits one thing among many equally possible things.

Now as we know, some have actually tried to deduce God's existence and necessity from the concept of God as an infinitely perfect being. To no avail. On the basis of the inadequate concept of God which is at our disposal neither his existence nor his non-existence, and neither his possibility nor his impossibility,is evident to us. Only two points can be established, one of which we talked about in discussing the ontological argument, and the other of which we talked about today:

a) God is not contingent, but rather either impossible or necessary.

b) If it is correct to speak of a number of divine perfections, these are certainly inseparable from one another. In whatever manner such perfections are to be attributed to him, either none of them is real or all of them are, and either each of them is impossible in itself, or all together are necessary.

It is a consequence of the first point that the question of God's existence coincides with the question of whether he is possible (he is either actual or impossible).

It is a consequence of the second point that the question of whether God is possible coincides with the question of whether a single one of the perfections we attribute to him is possible. The unconditional probability of the existence of God is thus equal to the unconditional probability of one of his attributes.

Considered *a priori*, then, and apart from any experience, is there more to be said for or against the possibility that God exists?

We can answer this question only by acknowledging our complete ignorance. *A priori* there is nothing to be said for or against it. Lacking a sufficient idea of God's essence, we are deprived of the single means of getting some clue as to what the *a priori* judgment concerning this question should be. (Such a clue, of course, would be a directly evident criterion at the same time, at least for one who was qualified to understand it.) Now when a matter is so obscure for us, and nothing can be claimed either pro or con, the chances for and against its possibility remain equal. Therefore the *a priori* probability that a single divine attribute is possible would be = 1/2. Thus with regard to the question of God's existence, too, the chances for and against are equal, i.e., the unconditional probability of God's existence = 1/2.

In other words, like experience, the concept of God also fails to provide anything that tells overwhelmingly in favor of, or against, the unconditional probability of the theistic hypothesis. So here, as elsewhere, what Laplace said holds true: The unconditional probability of the theistic hypothesis rests on our knowledge and on our ignorance. What we do know is that here only two alternatives are conceivable: either God is necessary, or else he is impossible. What we do not know is any *a priori* reason why he should be one rather than the other.

156. Now if we consider the position in which we find ourselves at this point in our inquiry, we cannot say that the result is an especially unfavorable one for the theistic hypothesis. On the contrary, in the ratio 1/2 we have a greater unconditional probability for the theistic hypothesis than what can be claimed for thousands and thousands of other hypotheses which are proposed to explain given phenomena and shown to be completely certain. I could be content to refer you to what Laplace said, that the laws of nature which we postulate hypothetically have an infinitely small unconditional probability, but I would prefer to illustrate this point further with examples.

Suppose that someone assumes, in order to explain some phenomenon, that one physical object, coming from a certain direction, has run into another with a certain speed and force. This assumption would have an advantage over the theistic assumption insofar as its possibility is not open to doubt. But the advantage is far outweighed by the fact that, given a finite number of moving bodies in the relevant location, an infinite number of directions and degrees of force are possible, such that out of infinitely many possible alternatives, only one is actualized. Considering just one direction, or just one degree of force, one hypothesis has an infinite unconditional improbability (mitigated perhaps only by the coincidence of determinations). Considering both together, we get an overwhelmingly greater infinite improbability of a higher order for such an hypothesis. Compared with this, a rival hypothesis which involved only the one improbability and not both would be infinitely superior in terms of its unconditional probability. Nevertheless, the hypothesis which specifies both direction and degree of force is not an especially daring one, and it is possible for it to be established with complete certainty.

Another example: Consider the assumption that there exists a planet at a certain point in outer space, just as Leverrier assumed there was in order to explain irregularities in the orbit of Uranus, if I may mention this famous case again. He confidently maintained that beyond Uranus there must be another planet, and he gave precise calculations for the size of its orbit, the eccentricity of it, the location of its perihelion, the period of its revolution about the sun, its mass, the time of opposition, and so forth. He wrote and asked the astronomer, Galle, in Berlin, to search the sky for the star which had been discovered in theory. On the night of September 23rd, 1846, the very day Leverrier's letter had arrived, Galle actually found a star of the eighth magnitude, that wasn't included on the star map, and he found it near the place where the Frenchman had indicated the new planet would be located. It turned out to be a planet with the characteristics Leverrier had posited; the soft light of Neptune returned Galle's gaze. And yet, how small the unconditional probability was for this hypothesis, for each element of the assumption, and above all for its being so complicated!

We can see, therefore, that where our hypothesis is concerned, even if the unconditional probability of God's existence is not equal to that of his non-existence, but a million or a billion or infinitely many times smaller instead, still this would be no reason to reject it altogether or to regard it as not admitting of any certain proof. For the unconditional probability of the theistic hypothesis remains superior to that of other hypotheses which posit a cause in order to explain certain facts and are then established with complete certainty.

157. Let us summarize what has been said. I believe three things have been sufficiently shown:

1. That the argument rests on a false general presupposition when it assumes that an hypothesis having unconditional improbability, and

being made up of a variety of assumptions that are infinitely improbable, can never be established with physical certainty.

2. That the reasons given for the theistic hypothesis having an extraordinarily high, indeed, an infinite and an infinitely infinite unconditional improbability, are invalid, one and all, and rest upon the failure to notice some very essential factors.

3. Finally, that the unconditional probability of the theistic hypothesis is no greater, but also no less, than that of its contradictory, i.e., it is equal to 1/2.

Even without this last result (at which we've been able to arrive only by means of a more careful analysis and by inferences from earlier results of our inquiry), enough has been said already to make it apparent that the attack against us is completely unjustified. A simple comparison with the unconditional probabilities of hypotheses which we are accustomed to make in daily life, and in science, and to establish with certainty, completely disposes of all the objections raised.

Recently two professors from Freiburg, the political economist, Lexis, and the physiologist, Kries, have voiced the claim that objective probability cannot always be expressed by a mathematical ratio, not because we aren't always able to calculate the ratio--as no one will deny--but because more often there actually is no quantitative relation between the probabilities pro and con. They make this claim especially for cases in which our data are very incomplete; in such cases there would be contradictory results. Since ours is a case of very incomplete data, they would surely reckon it to be among those that lead to contradictory results.

I confess that I hold this theory to be absolutely irrational, although I understand what might lead to the mistake. I will not now go into the reasons, though, why I adhere unshakably to the old view of the great mathematicians. That question might be of importance in some other connection; but for our case, the assumption of the modern mathematicians doesn't alter anything essential. The recent view, too, removes every possibility of rejecting the theistic hypothesis *a priori* as untenable,on the ground of an unconditional probability which is too slight, and of saying that it is at a disadvantage in comparison with other hypotheses.

158. The ease, finally, with which the theistic hypothesis is assumed by ordinary people,agrees quite nicely with our conclusion. Indeed, aside from our more precise refutations, this fact alone would constitute an argument against the correctness of the objections to our view. Although it is incapable of determining the exact degree of probability, so-called sound common sense leads, by and large, to a correct assessment. And it

was not without reason that Laplace called probability calculus the scientific justification of common sense.

Common sense instinctively resists hypotheses of unusual unconditional improbability, and especially very complicated ones. Just as it unconsciously observes the laws of logic, so it also observes the law that it is best to choose the simplest hypothesis. This is why common sense is in many cases absolutely against the hypothesis that there are chance occurrences, e.g., against the suggestion that the text of the *Iliad* came about by means of a blind combination of the letters. But it is not prejudiced against the theistic hypothesis. And yet, wouldn't we expect it to be, if the theistic hypothesis were really as complicated as our opponents make out?

Likewise, we find that common sense does resist the assumption of a white, or a learned, or a penetrable crow, but it doesn't resist the theistic hypothesis, even though this posits something exceptional. Why the difference, if the principle, that the more general the law the less believable an exception, had the same significance for the latter case as it has for the former?

159. V. If we could prove the existence of God it would be on the basis of his creations. This presupposition is at the bottom of all the previous observations. But this, too, is impossible and therefore in reality any possibility of a proof is ruled out. And why can we not prove the existence of God on the basis of his creations? Because they do not stand in any proportion to the cause. They are finite, God is infinite. How is one supposed to know the infinite cause on the basis of a finite effect? A comparison may make the idea clearer still. Imagine a picture done by Raphael, but hastily dashed off with a few brush strokes. The master's whole art cannot be known from it. Much less is the greatness of God to be known from a finite created thing. Therefore such things cannot reveal the infinite creator to us.

Reply: This argument was known long ago. Among others, Thomas Aquinas considered it and remarked that it does make a point, but not as strong a point as might be believed. Of course, it is not possible, on the basis of effects that do not stand in proportion to their cause, to have a perfect knowledge of the cause, but one can have imperfect knowledge of it and know, in any case, that it exists.

Thus one would recognize those brush strokes, which were dashed off so easily, as the work of a gifted painter, even if one didn't know they were produced by Raphael. That we are able to acquire perfect knowledge of divine activity is more than any reasonable theist would maintain.

160. *Objection*: One who recognizes a first cause of the universe still does not know God if he does not also recognize an infinitely perfect being, for only *this* can be called "God." But we could prove the existence of an

infinitely perfect being on the basis of its effects only if they were infinite, too. However, not a one of God's works is infinite, nor are all of them taken together. Therefore we cannot conclude that God is the cause of the universe.

Reply: Causal power is to be measured, not only by the magnitude of the effects, but also by the manner of causation. For example, the amount of heat which affects a body is to be measured not only by the degree of heat transferred to the body but also by the speed of transfer. If, in an infinitesimally short time, a certain finite degree of heat were to be transferred, then the heat of the heat transmitting body would be infinite. The same holds for the work of God, and so it is actually possible, despite the finitude of the work, to prove that the power of God is infinite. In the case of God it is a matter of creation and of preservation, which latter is a manifestation of the same power, or as it has been said, preservation is a continual creation. This kind of causal activity is quite distinct from all others. When a chemist produces water out of oxygen and hydrogen, and when the creator creates these elements, what we have are two fundamentally different activities. The creative activity requires infinite power, and if there really is such an infinite power, then the reality which proceeds from it must be infinitely superior.

161. *Objection*: We're supposed to know God by the manner of causation? But wasn't it conceded earlier that we never have any insight into the manner of causation, neither here nor anywhere else?

Reply: Of course, but that was in a sense which does not contradict our present claim. The creative act remains incomprehensible to be sure, just like the attraction of one body by another. But this does not prevent our being able to determine, in addition to the effect it produces just what it is that distinguishes this causal activity from others. Thus, for example, we can say that in this case something is created out of nothing, that an effect of finite magnitude has been produced instantly, and the like. The obscurity which remains does not prevent our recognizing the infinite superiority of creative power. Indeed, when we understand that the creator himself is not likewise in the dark about these things, it serves as a fresh clue to the endless disparity between him and us.

Actually, the things in the world which are included in our experience, though they do not reveal an infinite creation, are nevertheless such that we must say we are very far from understanding the work of God perfectly, since infinite knowledge would be required for that.

In a famous passage from his *Philosophical Essay on Probabilities*, Laplace points out that everything in the world is governed by necessary laws:

> "Therefore," he concludes, "we must regard the present state of the universe as the effect of its earlier states and, on the other hand, as the cause of the state which will follow. A mind which could know all the forces at work in nature in a given moment, and the relative positions of all the elements of which it is composed, if it were also powerful enough to submit the given quantities to an analysis could express, in the same formula, the movement of both the greatest heavenly body and the merest atom. Nothing would be unknown to such a mind, the future and the past would be in plain sight for it. And," he adds, "the human mind offers a pale image of this intelligence in the degree of perfection to which it has brought the science of astronomy. Discoveries made in the domains of mechanics and geometry, together with the discovery of universal gravitation, have made it possible for people to grasp both past and future states in the same analytical expressions. By applying this method to other subjects,it has been possible to trace observed phenomena back to universal laws, and to foresee phenomena which the given circumstances will necessarily produce. All the effort expended in the search for truth serves to bring the human mind ever closer to that exalted intelligence but,"--note this admission, which is decisive for our inquiry--"it *will always remain endlessly remote from us.*"

This is not rhetorical hyperbole, as anyone will know who considers that we will not ever be able to determine the exact relation of the circumference to the radius of a circle. No matter how close we get to absolute precision in this determination, we're always infinitely far away from it. And this sort of thing happens in all areas. But when it is a matter of an infinite series of progressive consequences, the little mistakes we make are complicated and compounded, such that even a finitely distant future, or any future time bounded by an instant however distant, must dissolve away in indeterminacy for us.

This must hold for any intelligence which is not in the strictest sense infinitely superior to ours. But we shall see--and the proof is not very difficult--that this will not hold for the creative intelligence. Therefore it must be infinitely perfect. That this is so becomes even more obvious when one considers that the issue here concerns not a finitely distant future, nor even a future measured in eons, but rather the prospect of a development which continues quite indefinitely. So, in fact, the knowledge of it utterly loses any relation to finite knowledge, just upon considering the scope of its object, even though the development nowhere exhibits an infinite reality and perfection. For, as Anaxagoras put it so elegantly, concerning his "*Nous*": "Mind knew that which was, and that which is, and that which will be, and ordained all things from the beginning."

Can anyone still doubt that we're dealing with the assumption that there exists a really, infinitely superior, infinitely perfect being? We can also add here that not only the infinite abundance of what it knows, and not only the infinitely greater precision of its knowledge, but the manner in which the creative being possesses such knowledge also reveals its infinite perfection. The little that we do know we discover painfully, developing it gradually by calculations and demonstrations, knowing now this and now that. But the very opposite of all these faults and imperfections is realized in the first, creative thinking which, in its eternity and immensity knows everything that it ever knew, knows it completely and, naturally, in accordance with the appropriate position in time. All this will be made clear in the discussions to come.

If it is possible to prove that there is a creator of the universe, then, there can be no doubt of his infinite superiority.

162. *Objection*: Someone who doesn't hesitate to concede the creator's infinite superiority to us might still harbor doubts as to whether this also establishes the creator's *absolutely* infinite perfection.

Reply: This misgiving would appear to be entirely unjustified. I've stressed, above all, that infinite perfection is not possible in a finite genus. There is no relatively infinite perfection which would not be absolute perfection. The mistake here is similar to that made by certain mathematicians who, because it is possible to speak of infinitesimal quantities of different orders, take this to mean there actually are infinitely great quantities some of which are greater, indeed infinitely greater, than others. They think a whole line has twice as many points as half a line, although the latter already contains infinitely many points. (And a plane would have infinitely many times as many points as a line.) But on the contrary, it can be demonstrated that there is a one-to-one correspondence between the two. (Likewise between the points in a plane and the points in a line, even if the line is contained in the plane.) So the argument from a comparison with infinite perfection leads to the opposite conclusion and confirms what I had said.

It would be unnecessary, but we could take the trouble to add to the demonstration, that the creator must be thought infinitely superior to us and to all finite things, by means of some further considerations. These would show, not only that everything which exists is due to the creator's power, but also that nothing at all is possible except what is made possible by its power. Thus the sphere of its power corresponds precisely to the sphere of what is absolutely possible. So for this reason, too, the creator is to be called not merely infinitely more perfect than we are, but also absolutely perfect.

With what has just been said, of course, the demonstration itself has not been carried out. We have only sketched out the way our future inquiries will go. Here we only mean to show how unfounded this objection is, which would discourage us in our undertaking at the very outset. It sounds quite plausible--"An infinite creator cannot be known on the basis of a finite creation"--but fairly careful consideration of it shows how hasty the conclusion is and how uncertain is its basis.

163. VI. And now, after so many others, one final objection. It is the most common one of all, and the one whose solution will require more of us

than all the rest, although it appears to be the least convincing in terms of its logical form.

How is this paradox to be resolved? The objection rests on the fact that up until now all the attempts to prove God's existence have failed. A popular argument, by which quite a few are swayed. Many proceed very superficially in drawing the inference here, since they do not try to establish this alleged fact by means of direct and detailed examination of the attempts made so far. Instead, they regard the disagreement among philosophers as sufficient evidence. If any proof were valid, they believe, then the opposition would be silenced.

Others do inspect the proofs which have been constructed by various philosophers. But finding themselves satisfied by none of them, and considering that there has been no better success after thousands of years of trying, they believe future attempts are hopeless, for such attempts would have to have essentially the same means of proof available to them.

These arguments are very much in keeping with the way so many are giving up on philosophy these days. Actually, it is not only on this point that there is disagreement and inconsistency in philosophical opinion, in contrast to the agreement in other areas of knowledge. And what one reads in famous philosophical books is often quite imperfect.

But the other disciplines, too, have offered such a spectacle in the past, some of them longer than others. Mathematics had long been proceeding with certainty and precision when physics, chemistry, and physiology were still getting things quite monstrously mixed up. Nevertheless, they were later saved from their confusion. Isn't it conceivable that certain factors have operated to keep philosophy still longer in such straits, but that for it, too, the hour of salvation will come someday? Of course! And those factors really do obtain, and can be demonstrated quite clearly. Thus this doubt as to the future of philosophy is entirely unjustified.

164. So much for the superficiality of such philosophical quibbling in general. As regards our particular case, there are other reasons not to be taken in by it. In recognizing the validity of the proof of God's existence, the greatest thinkers have always been in agreement. Aristotle, Plato, Locke, Newton, Descartes and Leibniz accepted it. It was only in connection with a general decline in philosophy that doubts first began to emerge and become influential. We've become acquainted with Hume's and Kant's doubts, and we've criticized the skepticism and critical philosophy from which they grew. But if someone is unsatisfied with the proof of God's existence, quite independently of these general theories as they are usually presented, his doubts will be found to have some connection with objections which have only been raised in recent times. I'm thinking here especially of objections to the proof of a prime mover, on the grounds of the law of conservation of energy, or to the teleological proof on grounds of Darwinism. But if these objections are supposed not

yet to have been met satisfactorily, does it follow that they are absolutely irrefutable? They are based on new data, so the answers given thus far are the first attempts at refutation. Why should these have succeeded right away in every respect? There have occasionally been objections which have ultimately proved to be unjustified, although it took a penetrating mind and the utmost attentiveness to solve them. Consider the famous objections of the Eleatics against the possibility of motion, which even Herbart had declared to be absolutely unsolvable, although they are nothing but paralogisms. Who could guarantee that the situation will not be same for the objections which have cropped up lately against the ancient proof of God's existence? What justifies us in concluding that these objections are really irrefutable and devastating, simply because many who are neither incompetent nor uneducated have been frustrated by them? Perhaps they are rather just deceptive paralogisms, too, so that the existence of God is not only demonstrable but remains demonstrated by the old arguments? Not by all of them, to be sure, since we will not feel tempted to revive the ontological, *a priori* arguments. But it may have been demonstrated by some of the old proofs, perhaps even by such as were not unknown in antiquity.

165. Even aside from what I've explained here, it will be self-evident to anyone who looks carefully at this last objection, that, as has been said, it is not formally valid. Nevertheless, as I said, there is a certain sense in which it will require more of us than all the rest of the objections. For in order to uproot this one completely we must take the unfavorable judgment of the available theistic proofs and turn it into a favorable one by actually spelling them out step by step and defending them against all attacks, ancient and modern.

All the remaining considerations will be devoted to this task.

PART TWO

THE PROOFS OF THE EXISTENCE OF GOD

A SURVEY OF THE PROOFS ATTEMPTED THROUGHOUT THE HISTORY OF PHILOSOPHY

166. A variety of attempts have been made to prove the existence of God. In the preceding lectures I've made it clear that I do not hold all of them to be unsuccessful. But many of them must be regarded as quite worthless.

In refuting the view that the existence of God is evident *a priori*, we had occasion to speak of the ontological argument, with which many have hoped to demonstrate God's existence *a priori*. However, as we came to recognize, it amounts to nothing but a paralogism.

Other ostensible proofs, too, proved to be insufficient or completely mistaken. Thus, for example, Descartes made an attempt to rest the proof on the fact that we possess the *idea of an infinitely perfect being*. This idea must have a cause, and at that, a cause whose power is sufficient to produce such an effect. Now since no finite cause, whether external things or our own selves, could be viewed as a sufficient cause--for in that case the effect would be more perfect than the cause--it must be concluded that the cause of this idea is an infinite being. God himself must have produced it when, as human artists also tend to do, the creator of the soul left his mark on his work.

This proof, I maintain, is completely unsuccessful. It is erroneous, root and branch. For the alleged fact on which it rests does not obtain. We do not possess an idea of God such as is presupposed here. It would have to be an adequate idea of his being. Compared with such an idea, the concept acquired from our empirical data has the look only of a poor substitute from which nothing can be gathered about the possibility or actuality of God.

Perhaps more than one of the other attempts at proof will be similarly unable to withstand criticism, and it might be interesting to demonstrate this. But let's not dwell on them here. Let's rather turn to the proofs which seem, to me at least, either to be certain and unshakable or to provide valuable support for the theistic view. I wouldn't be right to neglect any of the false arguments of our opponents. But I don't need to consider all the imperfect arguments in favor of theism, nor to expose their faults, since even if we should unjustly think too little of one of them, this would not detract from the force of the proofs that we do carry out.

167. So we turn directly to the proofs we hold to be valid and to the point. They are the following four:

1. The teleological proof, from the rational order in nature.
2. The proof from motion.
3. The proof from contingency.
4. The psychological proof, from the nature of the human soul.

These four proofs contain, it seems to me, everything that has been properly stated in favor of the existence of God. Perhaps each one of them is to be viewed as a perfect, physically certain proof, not strictly in need of confirmation by the others. But as is the case elsewhere in science (e.g., in determining the rotation of the earth's axis and the like), such confirmation is certainly most welcome when it comes to this important subject, just because it serves to make it easier to dispel our worries about mistakes that might slip in unnoticed, as happens even in more complicated mathematical proofs.

Not only do these proofs agree in their goal, but they share a common way of arriving at it, inasmuch as they come together before the final goal is reached. For all of them prove first the existence of a creator and only after that the existence of an infinitely perfect being. (The teleological argument could most easily dispense with this intermediate step; but for it, too, this seems to be the most natural way station.)

168. Even before this point we could combine the several proofs by borrowing factors from each of them. This is what Aristotle did (in the so-called 12th Book of his *Metaphysics*), and it makes things easier in many ways. But then we would lose the advantage of reciprocal verification, which I mentioned above, and perhaps other advantages, too. In any event, the investigation would lose some of its charm, since at least the simplicity of the separate arguments, which many think gives them a certain beauty, would not be brought out in the same way.[25]

As has been said, we will pursue each of the proofs separately (the first two in more detail, the third and fourth as thoroughly as time will allow), up to the point where the fact of a creator is established. But even in their first parts, the four proofs share a *common method.* None of them proceeds *a priori*; rather all are based on experience. Our method in each of the proofs will be the one followed by the natural sciences when they infer a cause on the basis of observed phenomena. In each case we, too, will infer the cause from the effect.

169. The proofs are to be distinguished, however, according to the differences in the observations upon which they are based.

The order in which I have presented them is that of their historical succession or, to be more precise, it follows the historical order of the first attempts, by the gradual perfection of which the four proofs have been constructed.

The oldest is the teleological proof. It goes back to Anaxagoras, indeed, a rudimentary form of it may be found much earlier than that in Thales, the Father of Philosophy.

Plato was the first to attempt a proof from motion, though to be sure he did it very imperfectly. Aristotle presented a modified version, and since then--like the others--this proof has undergone many alterations.

Aristotle laid the foundation of the proof from contingency. Also the first rudimentary forms of the psychological proof can be detected in him, although he did not carry it to completion in the writings that have been passed down to us. (John Locke also set great store by the psychological proof.)*

In developing the arguments for the existence of God we will hold to this order, and not only because it is the order in which they originated--a different and more important circumstance makes this the most favorable course to take.

170. The first two proofs are surely the most effective of all. The other two, though perhaps they are just as convincing in themselves, produce confidence with more difficulty. This is so of the third, because it deals in very abstract concepts, where the danger of fallacies, especially of equivocation, is greatest, as everyone knows. So in this case the mind betrays an inclination not to trust itself, as happens in other metaphysical inquiries of a similar nature. The fourth proof is certainly free of this drawback. However, because it takes as its point of departure the immateriality of our soul, it rests upon a fact the establishment of which also raises the most difficult problems of philosophy and perhaps requires

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* Some further proofs of the existence of God are mentioned occasionally:

a) the so-called moral proof, from the phenomenon of conscience,

b) the proof from the *consensus gentium*.

c) the proof from the consequences of atheism, in particular of thorough-going atheism.

(All human beings desire knowledge by nature. Therefore the truth cannot lead to their undoing, to the disintegration of human community. But it would have this consequence if atheism were the truth.) I don't mean to say that each of these arguments doesn't contain correct ideas, but they don't really amount to additional proofs since they can all be reduced to the teleological one. The first is a part of the teleological argument, and it is precisely in its position relative to the whole argument that it comes to be of overwhelming significance. Something similar may be said for the aesthetic and logical proofs which are distinguished by some. The aesthetic proof rests on the fact of beauty in nature and the way it appears to a perceiver, e.g., in colors by means of the reflection of vibrant motion (Cf. Trendelenburg, *Logical Investigations*). The logical proof is based on the fact of regularity, which makes the knowledge of truth possible. The second proof above is a sign of how obvious teleology is in the world, and particularly in the human conscience. But deprived of its connection with the teleological proof, this argument is of no striking significance. The inference which is sometimes drawn, that the belief in God must be innate, is simply false. The difference in the ideas which people form of "God" speaks against it (Cf. Locke and Hume, and Section 10 above). Anything that really exists admits of more than one explanation (Comte). The third proof obviously presupposes that what is desired by nature cannot be ruinous, and so it is fundamentally teleological, too. In the recognition of such a desire the purpose of human nature is already recognized.

even more complicated investigations than the proof itself of God's existence. For this reason the psychological proof, although considered objectively it is reliable, may yet be the most awkward one of all for leading people to a confident acceptance of its conclusion. It might be preferable to proceed in reverse, namely, to use the existence of God as a premise in the proof of the immortality of the soul. All the same, no one would say this proof is without importance as a confirmation of previously constructed proofs. Anyone who had devoted himself to psychology, however protracted his studies, would always find it remarkable to see it lead necessarily to an assumption which had been proven to be required on other grounds.

If one compares the teleological proof with the proof from motion, it becomes apparent that the former is more effective in general, the latter in specific cases. The former quickly wins over so-called sound common sense. It is the one which even the ordinary person can understand to a certain degree. But if the proof is to be constructed accurately it must be made more precise, so that its conclusion is demonstrated with perfect physical certainty and every objection is disposed of. In this connection materialism has kicked up a lot of dust. I have even found people who had gotten so accustomed to taking a materialistic point of view that they were virtually incapable of seeing and appreciating any trace of purposefulness in nature. They began to laugh whenever anyone spoke to them about it.

For such people, therefore, the proof from motion is much more effective. It is superior to the teleological proof, too, in that it presupposes so very little--nothing more than the simple and certain observation of some change--and from this point it proceeds through a series of entirely valid inferences to establish the existence of an infinitely perfect being. Thus it approaches the character of a mathematical proof, and in fact it may be better suited than any other to convince somebody very bright.

However, the disparity between the greatness of the result and the insignificance of the first datum is something so astonishing and of such enormity that this alone will arouse the suspicions of many. Such a slight foundation doesn't seem able to support such a mighty structure. And usually, therefore, people are more inclined to trust the teleological proof, which rises above a whole wealth of observations,from the most diverse areas, as its broad foundation. All the same, I hope that the validity of both these arguments will be equally evident to you.

As far as the order of the proofs is concerned, it is obvious, as has been said, that it is generally best to begin with the teleological proof, and follow this with the proof from motion. This is most naturally followed by the fairly closely related proof from continency, while the psychological proof takes the last place as confirmation of the rest.

Let us turn first of all to the teleological proof.

THE TELEOLOGICAL PROOF

FIRST PART: THE APPEARANCE OF TELEOLOGY

I. THE FOUNDATION IN EXPERIENCE

171. The basis on which the teleological proof rests is the fact that in the universe, and--to turn our attention first to the earth--on the earth,there are a multitude of objects which appear in every way to be ordered for a purpose, both in their being and in their operation. Yet it is a purpose which can have been dictated neither by a human understanding and will nor by any animal desire.

This fact is very wonderful in itself, as well as being well suited to arouse philosophical amazement, especially because the ordering of things seems to have required means and motives which only an artful intelligence could have chosen. Such an intelligence would far surpass all human learning and inventiveness both in its knowledge of nature and her laws and in its wisdom.

Of course, there are people who are nevertheless not amazed. Only for a few is it because the facts are not known to them, for they are evident to everyone to some degree, although more so the more knowledge one has acquired of the relevant objects. But for the most part, the reason why people are not amazed is that the facts are too well known, and what we're accustomed to encounter no longer astonishes us, even when we cannot explain it in any way. Thus almost nobody wonders about the phenomenon of gravity, but people are amazed by electricity, even though the one is just as mysterious as the other.

Therefore it would be a good idea to bring the facts freshly to mind here, and outline the essential features of them briefly.

172. There are two great realms of nature in which teleology confronts us--the realm of living things and that of inorganic matter. Most people notice teleology in the former, but only a few recognize it in the latter.

In the realm of *living things* the phenomenon of purposefulness is least obscured and most obvious in cases of *unconscious* functioning.

Here there are to be included all the phenomena of vegetative life, and with them, as well, reflex actions in the strict sense of the word.

Purposefulness is just as clear, though less easily noticed, in cases of *half-conscious functioning*.

Here there are to be included instincts, moral instincts and instinctive judgments, too, and voluntary movements of the limbs. Nevertheless, even at this point the fact of teleology escapes many people who had grasped it quite well in the phenomena mentioned above.

As has been said, it goes even more frequently unnoticed in the realm of *inorganic matter*. All the same, for anyone who has come to understand teleology in the realm of living things, it is not hard to see that what is lifeless and inorganic in the world likewise bears the mark of purpose, in so far as it stands in the most intimate interrelations with living beings.

Moreover, even without taking these relations into account, those who think carefully about it will find a certain proof of the fact of teleology.

The Appearance of Teleology in the Realm of Living Things

173. I. Let us consider first of all the realm of living things, directing our attention to *completely unconscious activity* in particular, such as we observe in plants. But even richer and more artfully intricate are the vegetative functions of animals and human beings. Here everything gives the impression of existing and operating for the sake of a goal--the development and continued preservation of the organism itself, which is in a constant process of passing away, and the creative construction of another organism, similar to its parent in general, but sometimes, too, not insignificantly different and relatively more perfect, in consideration of changes in the surrounding circumstances. And the work such an organism does is wonderful in its beauty as well as in its achievements.

In regard to its beauty we need only note, with the sacred books of our people, that the lillies of the field, which neither sew nor spin, are yet more beautifully arrayed than Solomon in all his glory.

Even the naked eye recognizes the truth of these words, and the more so with the aid of instruments which always reveal new traces of beauty where only irregularity and rough patchwork were seen before. And what is true of the lillies and other flowers and plants is true to a higher degree of animal organisms, of butterflies and beetles, of fishes, birds and land animals, and above all of the sublime beauty of a lively and nobly structured human countenance, so wonderfully suited to give expression to every movement of the soul.

174. But these works of wonderful beauty are at the same time (so it seems, at least) very well designed for performing certain functions, and very cleverly organized in keeping with their purposes. So even someone who doesn't think much of these organisms must still say that even the least of them, the plants, are like machines which infinitely outdistance all the machines devised by human ingenuity.

Let us consider a modest little plant such as the violet. We know its aesthetic virtues. But how astonishing are its, so to speak, mechanical achievements, too! This flower, with its fibrils, knows how to preserve itself more enduringly than a chain of forged iron or than the Egyptian pyramids. The latter crumble and the former rusts and breaks apart; but by flowering and forming seeds the violet preserves its kind on and on through millennia and into the unforeseeable future as hardy and fresh as ever. This is an achievement which no human mechanic can approach. A professor of physiology, who used to be my colleague in Würzburg, Petzold, was very good in his field but a bit amateurish in philosophical questions and given to a superficial materialism. In a course of lectures he once ventured to express the hope that mechanics, which is now in its crude beginnings, might someday in its further progress be able to build a machine able to renew and preserve itself and make other machines like itself out of material in the environment, thus reproducing itself. A smile comes to your lips! And in fact what happened to him is that his students laughed at him. It seemed to them that he was saying something unbelievable. And the expression of such a hope for mechanics made clearer in their eyes perhaps than it had ever been before the extraordinary achievement of even the simplest plant, as well as the immeasurable difference which still obtains between what a plant does and the highest achievements of the most complicated works of human mechanics.

175. And yet what we find in the higher animal organisms and in man is even more wonderful.

The organization of plants appears simple by comparison. If appearances do not deceive, the ends to be achieved are higher here. For the organs of nourishment and reproduction not only have to renew themselves by metabolism and mutual interaction in order to continue performing the same functions. But they also have to support organs of higher faculties, of sensation, of desire, and of voluntary movement. These organs have a higher calling, a higher task to perform, for example, the wonderful formation of the eye, especially as physiology knows it.

And the operation of the brain must be far more wonderful still! Indeed there were materialists who made no bones about speaking of "gray matter" as though it were like mush. But they really didn't know what they were saying. Even though we cannot clearly analyze the wonder of its structure we can infer it from its achievements.

Let us leave undecided the question as to whether the brain itself experiences sensation, which would give it an especially distinguished position *vis-à-vis* the other organs of the body. In any case the brain is at least the first intermediary factor in sensation, and involved as an aid to every conscious activity--in sense perception, in memory, in abstraction and fantasy, in judgment by direct or indirect evidence, in affection and noble sentiments, and in the sublimest willing and striving which even affects the detached observer with sympathy and, more than anything else grand and magnificent to be met within the world, moves one to enthusiastic wonderment.

A little pressure on the brain, an inflammation, a small disorganization, and it all becomes impossible, and we see instead perhaps only a dull brooding and a wild flood of ideas or mania and frenzy. How wonderfully ordered it all must be!

The most elementary of mental phenomena are the ideas of sense. But even these presuppose an order which appears to have been chosen! The eye not only conveys ideas of colors, but these in a certain order which can be the criterion of an ordered parallel in the external world. Hence the delicate branching of nerves in the retina. Each separate nerve fiber gives a distinct spatial presentation, or at least--as the so-called empiricists would have it--a distinct indication of one location in relation to its neighbors. But it is to the brain that all these particularities are conducted, and there they are recorded, and only in this way is our spatial orientation made possible.

What we find about space in the ideas of sense is similar to what we find about time in the ideas of memory. The successive impressions form a temporal continuum, which can only become possible by means of the wonderful order that psychology analyzes in greater detail.

If this is the case for the most elementary and primitive mental phenomena, then the marvels of apparent, mental teleology are multiplied and magnified with each fresh complication of mental life. Each complication shows the brain to be such an inconceivably great work of natural mechanics that it is only too understandable why our scientific anatomy and physiology of the brain are absolutely incapable of comprehending the connection between structure and function. But if physiological analysis offers virtually nothing here, and will do so forever, this is just a result of, and witness to, the incomparable perfection of the organization which nature has been able to construct here.

176. Intuition, judgment, will and other sensitive and intellective mental activities appear to be purposes to which the vegetative functions carried out by the brain and other organs are subordinate. But it is not as though the former receive without giving. Even here there rather obtains a mutuality of assistance.

Only a limited number of materials are usable matter in the digestion of an animal organism. An animal is substantially dependent upon other organic materials and the higher animal organisms do not get these directly. The sensitive and intellective mental faculties must procure them by using the given organs of the vegetative faculties which are suitably constructed for this. Let us listen to the way one of the great, recent biologists describes the intimate connection between the whole organization of an animal and its nourishment:

> "Every living being," says Cuvier, "constitutes a whole, a single and closed system, in which all parts are mutually suited to one another and contribute to

> the same purposeful effect by means of mutual interaction. None of the parts can change without the rest being changed, and consequently each part taken by itself reveals, and yields, all the rest. So if the intestines of an animal are so organized as to be able to digest only meat and at that only fresh meat, then its jaws must be set up for devouring it, its claws must be structured for holding and tearing it apart, its teeth must be arranged for cutting the prey and chewing it to bits, the whole system of moving about must enable pursuit and capture, and the organs of sense must be suited to perceive the prey in the distance. Even in the brain there must be the necessary instinct, so that the animal can conceal itself and cunningly waylay its victim. The jaw requires, in order to be able to grasp, a definite form of the cardan joint, a definite relation between the point of resistance and the strength of the point of support, a definite size of the temporal muscle, while the latter in turn requires a definite width of the cavity that accommodates it, and a definite curvature of the zygomatic arch beneath which it extends, and again, this arch must have a definite strength in order to support the masseter. In order to be able to carry its prey away, an animal must have strength in the muscles which direct the head, and this presupposes a definite shape of the vertebra where the muscles originate and a definite shape of the back of the head where they are attached. In order to chew up the meat the teeth must be sharp. Their roots will have to be more solid depending on how many and how hard the bones are which the animal must break, and this in turn has an influence on the development of the parts which serve to move the jaw. In order that the claws be able to grasp the prey, a certain flexibility of the toes is required, and a certain sturdiness of the nails, which determine certain shapes for all the joints of the foot as well as the necessary distribution of the muscles and tendons. The lower leg must have a certain facility in turning, which presupposes certain shapes of the bones of which it consists. But the bones of the lower leg cannot be altered in shape without requiring alterations in the upper leg, too. In short, the shape of the tooth brings that of the condyle with it, the shape of the shoulder-blade brings that of the claws, just as the equation of a curve supplies all its characteristics. Thus if one took each characteristic of the curve as the basis for a separate equation, one would be able in each case to rederive the first equation as well as all the other characteristics of the curve. And in the same way, if one of the limbs of an animal is given as a beginning, then with thorough knowledge of the economy of life one could describe the entire animal. Furthermore one can understand that all animals with hooves must be herbivorous, and that because they use their front feet only for supporting their bodies they don't need such strongly built shoulders, which also explains the lack of a collar-bone and an acromion, and the smallness of the shoulder-blade. Since they also do not need to turn the lower foreleg, the radius can grow together with the cannon bone or even be joined to the upper foreleg by a ginglymus and not by a trochoides. The need to eat plants requires teeth with flat crowns in order to crush seeds and foliage. The crown of the tooth will be uneven, and for this purpose enamel and bony substance must alternate. Since this kind of crown, used for rubbing, must also be capable of horizontal movement (rubbing), the condyle of the jaw will not form such a close and fine articulation as it does in carnivores. It will be flattened out and thus suited to a more or less flat surface of the temporal bone. The temporal cavity, which only has to accommodate a small muscle, will be of less breadth and depth."

Here you hear that Cuvier does not merely say that everything looks *as though* it were for the sake of a purpose--he comes right out and claims that it is.

"All parts," says he at the beginning of the passage cited above, "are mutually suited to one another and contribute to the same purposeful effect by means of mutual interaction."

Let us hear what he says in yet another place:

> Zoology has a fundamental principle which is peculiar to it and which it applies to advantage upon many occasions. This is the principle of final causes. For nothing can exist which does not unite in itself all the conditions which are necessary to its existence. And so the different parts of a living being must be constructed and coordinated in such a way that they make the whole possible not only in itself but also in relation to the beings which surround it.
>
> "The principle," he says further, "often leads to universal laws which are just as clearly derived as the result of a calculation or of an experiment."

By applying this principle of final causes, Cuvier himself was able, on the basis of a single bone from an as yet unknown prehistoric animal, to infer the entire structure of it in its essential parts with complete certainty. And his construction was then confirmed by the subsequent discovery of an entire skeleton.

177. Such successes do serve to recommend the method. And so one could say that Cuvier's principle has held good most brilliantly and the hypothesis of final causes has proved fruitful in a way that usually only the most reliable theories of natural science can boast of.

Nevertheless, we wish to take care not to claim immediately, on this basis, that what we have here is really an order involving means and ends. For the time being, we will stick with our more modest proposal and repeat--but of course with considerable caution--that it is undeniable that these objects look entirely as though they exist and operate for the sake of some end which could have been established for them only by a superhuman understanding.*

Before we draw further conclusions, we want to see how the same fact can be established in other realms of nature. Then we will hear and dispose of the objections. And when it has become wholly indubitable that in all realms of nature there is the *appearance* of a purpose, only then will we try to find out whether we may for that reason say that there is a *real* purposeful order in things.

II. The account I gave of apparent purposefulness in organic nature deals almost exclusively with the effects of an entirely unconscious activity.

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* Compare here, Karl Ernst von Bär, *Reden und kleinere Aufsätze*, volume two, especially the essay, "Über Zielstrebigkeit in den organischen Körpern." (Second Edition, 1886)

178. Completeness would demand that I speak of the *half-conscious* activities, too, which I touched upon earlier--the remarkable fact of so-called natural instinct (and others related to it), and the phenomena of voluntary movement.

a) *Instinctive activity*, for example, the building of nests, hatching of eggs, and rearing of the young by birds,has the unmistakable character of striving for a goal and employing means. No one denies it. In fact, many mistakenly wonder at the clever foresight and skill of these little creatures. A bird never strives for anything but what is most immediate. It has a blind impulse to do what serves a more distant purpose, without having a presentiment of it. A bird has no innate idea of a nest, as even Cuvier had thought, for the doctrine of innate ideas is generally no longer maintained today. It is blind to the result of its activity, just as a human being is when he follows his instincts, for example, when a nursing infant drinks from its mother's breast for the first time. And we all experience the same blind impulse in hunger and thirst, in the sexual drive, and the like.

Of course, Wallace has recently tried to show that nest building does not take place entirely blindly. He believes he is able to demonstrate that the young are instructed in this by their parents. According to his observations, when the young are isolated they fail to develop the skill of nest building. I confess that I do not at all hold such an experiment to be decisive. Indeed, I cannot even imagine how the parents give this instruction. Are they supposed to introduce this skill to their young theoretically or practically? If you follow out each of these hypotheses, you'll soon see that both are impracticable. A comparison with the instincts of insects is also instructive; they lay eggs only once in their lives, and then die (Baer and Weisman provide more details on this). If Wallace has really established the loss of the nest building instinct through isolation, then perhaps the instinct which would otherwise be there has failed to develop due to abnormal living conditions.

So the nest building instinct of birds, like other instincts, must be classed, not with rational, human skill, but rather with the so to speak non-rational skills, with the unconscious, purposeful operation of vegetative life. For although the little creature consciously strives only for what is most immediate and knows nothing of more distant results, still what it does looks quite as though it is ordered in the most suitable way for many more distantly removed purposes.

179. b) A kind of contrast to the phenomena of instinct is shown by the other class of phenomena that I mentioned, namely, those of *voluntary movement*. We wish to move a limb, and right away it moves itself. And hardly anyone doubts that it is our will which causes the desired movement. But it does so, not directly, but rather very indirectly. The

will causes something which we are not conscious of, and this causes something else in the same way and so forth, until finally after a long series of processes mostly unknown to us and in no way intended by us, the movement we desired occurs.

Now doesn't it look quite as though all the actions which precede the movement are means to the end desired by us? Yet they are not means which we ourselves choose. So it is as though the actions guided by desire also have an order of means and ends, which cannot have been established by us or by any other human understanding and will. If we look at the case of instinctive activity in birds, which we spoke of earlier, we find (because the activities are voluntary) that both kinds of apparent purposefulness in nature are united with the bird's conscious endeavor. The purpose of the bird's conscious desire appears to be in the middle between more distant ends, to which it is a means, and closer ends which serve the bird as means, and which conscious desire itself actualizes, one after the other, without foreseeing them.

But with these few words I must let the subject rest now, and take leave of the account of apparent purposefulness in nature as concerns the realm of living things, because other difficult matters remain to be addressed.

The Appearance of Teleology in the Realm of Inorganic Nature

180. Let us turn to the second great realm, that of lifeless and inorganic things. The investigation of this realm appears from our point of view to be of special importance.

Here apparent purposefulness is denied even by those who recognized it in the realm of living things. With regard to this contrast, Kant speaks openly of an antinomy of the teleological power of judgment. And in fact the name, "inorganic," appears to insinuate that here there is not an appearance of unitary design, as there is in the realm of living, physical bodies where every part appears as a means and an organ which serves the whole.

But the inorganic realm is by far the most extensive in nature. Organisms are actually like drops in the sea. And so for many it could seem that the traces of teleology which organic nature appears to offer vanish in the mass which bears no imprint of purposefulness.

But this is not so. Even the *lifeless and inorganic* things in the world clearly bear the mark of apparent purposefulness. And this becomes apparent partly when one regards them *by themselves* but partly, too, and especially when one considers their intimate interrelation with living, sensing, thinking organic beings. If any of the essential, or even quite accidental properties of the inorganic world is altered, the living things can neither continue to exist nor carry out their principal functions.

Several brief observations will sufficiently show, I hope, to what a high degree this is the case.

181. If we look at the domain of inorganic things, and compare their diverse elements with one another, we find that there are two kinds of unity in their diversity:

1. A unity of similarity;
2. a unity in the interrelation of forces and capacities, such that one provides what another requires for its operation, and they complement one another as it were.

But each of these unities bears the mark of purposefulness.

182. Let us look a bit more closely at the first of these two facts.

a) When we regard the realm of inorganic things, we immediately find that uniformity and agreement obtain among them over quite an extended domain. (Consider the multitudes of individual chemical elements; each one exists in vast quantities, and between two quantities of the same element there obtains perfect equality--they differ only in location.)

b) Moreover, everything is related to everything else, everything bears an analogy to everything else, and is governed by certain laws in the same, or a similar, way. Thus, for example, underlying all matter there are the three states of aggregation and the universal laws which apply to each. Further, a perfect agreement governs all matter with regard to the law of inertia and other laws of mechanics. Likewise there is full equality of all matter with respect to the law of gravity. All bodies attract one another in direct relation to their masses and in inverse relation to the squares of their distances. And anyone who knows that no force can operate directly at a distance will recognize right away that with respect to gravitation there is another remarkable equality among all bodies: All bodies in all circumstances are subject to the force of gravity in precisely the same way.

Naturally, these indications of harmony could easily be multiplied, for I might almost say that these kinds of equalities or similarities among bodies which are specifically quite different cannot be counted. But it will suffice even to have pointed out just these few.

183. So that is the first fact I spoke of concerning unity in the realm of inorganic nature. Now I ask, is this fact something self-evident, is it something to be expected *a priori* as necessary? Not at all!--neither in the more specific agreements nor in the exceptionless, universal ones. On the

contrary, they must be remarkable in the highest degree to someone who presupposes no common source of these equal and similar things. (I might well call attention here to an argument from the theory of evolution which infers, on the basis of analogies of structure in different species, that they have a single origin.)

Thus these narrower and wider circles of relation, and the unity of similarity which permeates all, are not self-evident and not *a priori* necessary, but still they appear to be teleological to the highest degree. They appear to be teleological from the standpoint of beauty, since there would be no proportion without equality and harmony. But they are teleological also with a view to truth and knowledge. The universal laws shed light which illuminates all areas. Analogies are the scientist's guiding thread. It is said that knowledge is power. Knowledge of an individual case which does not repeat itself? No, knowledge of those that always recur, knowledge of universal laws. And, in case there should be a single author of the universe, then the thoroughgoing unity of inorganic nature would be of eminent teleological significance as an indication of the unity of its author.

(It is interesting that this idea has not entirely escaped even a man such as Dühring, who vigorously rejects any idealistic world-outlook. In discussing Darwinism, he quarrels bitterly with the Darwinians for having also used the above argument. Hence the rather open declaration: This argument may not be used because with it we might run up against something which ought not to be discovered!)

184. Let us now consider the other unity I had mentioned, the unity in the relations between the mutually fulfilling capacities and forces.

The bodies which experience shows to us can act upon, and be acted upon by, each other. And if this were not the case, then none of them could be activated, since none can produce something out of nothing. So a second body offers to the first a capacity to be acted upon by one of its effective forces, thus fulfilling the condition that was lacking.

And while the first body thus receives from the second the fulfilling condition of its operation, it in turn makes possible the activity of the second body in the same way.

The two bodies exercise a reciprocal influence on each other, and indeed it's not just that a reaction occurs during a given action, but rather that the reaction corresponds most precisely to that action.

The famous law of the equality of action and reaction is valid universally in the physical world, just as the influence of bodies on one another is a universal fact permeating the whole of nature.

185. Here, too, we have something which is hardly self-explanatory. And this includes not only the law just mentioned but also how active and passive capacities fit together generally. Rather there is something

exceedingly wonderful in this mutual adjustment, even though only a few ever notice it enough to wonder about it. Here as elsewhere, habit makes them feel as though it is self-explanatory that bodies are able to affect one another. But in truth this is so far from being the case that the inner "how" of the effect will for all time remain just as unexposable a secret as is the influence which soul and body work on one another.

So this fact, too, is not self-evident but rather quite striking and remarkable. But it is equally clear that this is,at least apparently, in the highest degree a teleological fact. For it is primarily in the actualization of forces that the perfection of bodies and other things consists. Without it there would be no development; without it there could well be individual, isolated bodies, but no universe.

186. But in order better to appreciate what is striking and splendid about this apparent teleology, we mustn't merely call attention in general to the harmony of passive and active capacities. We must also observe the great variety of forces by means of which the various bodies come to have a reciprocal effect upon one another. It is by no means only through pressure and impact, or the so-called gravitational force, that bodies are able to affect one another. The most dissimilar physical forces can produce reciprocal relations between them. And in addition to these there are chemical forces. Different chemicals can "combine," that is, by operating on each other they mutually transform themselves so that entirely new kinds of matter are produced out of their difference. This mutual transformation of different kinds of matter into one, new, uniform kind seems to reveal the most intimate inter-adaptation [*Aufeinanderberechnetsein*].

And not only do all these diverse kinds of physical and chemical processes exhibit reciprocal action, but the law of equality of action and reaction appears to be observed everywhere.

187. The chemical processes, the most important of all, are also those which most clearly bear the marks of apparent teleology.

a) Not only do they most of all exhibit the appearance of a complete inter-adaptation of different kinds of matter, as has already been said;

b) since they are the most fundamental revolutions they also lead to the greatest developments.

c) As a result of chemical processes a vast kingdom of diverse kinds of bodies becomes possible in the world with just a limited number of original substances.

d) This is achieved particularly because the elements combine in more than one proportion, and the combinations themselves enter in turn into new and more complicated combinations. For a completely different kind of substance is the result of each combination in a slightly different proportion. And the law of the complete transformation of all the characteristics of matter holds good likewise in the higher, i.e., less elementary, orders of chemical combination.

e) But though the elements do combine, and the combinations themselves can in turn unite in higher combinations, still they are able to do this in only a few proportions. And combination upon combination cannot be complicated indefinitely, but rather even here a limit is soon reached.

This, too, seems purposeful in the highest degree.

It seems teleological that materials can combine in several different proportions, but it also seems teleological that they cannot do so in a great many different proportions. It seems teleological that the initial combinations pursue combinations of combinations, but it also seems teleological that this pursuit doesn't result in much too long a series. If the latter were the case, that is, if the increase of complication went on to infinity, then all universality would disappear forthwith, so that actually there would be no uniformity. But in that case there would be no order, no organic life, no scientific investigation of nature--in other words, in place of order, chaos! (It really is a disgraceful sign of the short-sightedness of the human spirit that this fact of the limited number of possible combinations of materials has been discovered only very recently. Whewell was quite right when he remarked that really one would have had to acknowledge this fact *a priori*. because otherwise there would no longer be two bodies of the same kind.)

f) The influence of physical conditions on chemical forces also appears to be teleological. As the physical conditions change, so does the chemical connection whereby the separation of what is combined, and the recombination of what is separated, are brought about. It is only as a result of this chemical connection that a lasting cycle of materials is possible, for otherwise things would speedily come to a standstill.

g) Finally, upon closer examination more exquisite marks of apparent teleology are seen in the beautiful regularity of the laws governing multiple proportions and chemical equivalents.

They have become the primary basis of the atomistic theory. This theory may not yet be regarded as perfectly certain by many, but the regularities themselves are incontestable facts. And they go along with other similar facts about inorganic nature, which are denied by the atomistic explanations, such as, for example, the principles of thermal equivalents and of the changes of volume ratio in the chemical combination of gaseous, solid, and liquid bodies. Everywhere it looks as though an aesthetic requirement had to be met--variety, and the highest order and harmony.

188. I've made these last suggestions only in passing, and there is hardly one among you, who is not already an expert well-versed in the subject under discussion, to whom every detail has become perfectly clear. A more thorough presentation would necessitate a much longer digression. And such a digression does not seem to be indicated, since even what has already been considered establishes sufficiently the apparent teleology in inorganic nature which we wanted to show. Nevertheless we mean to call to mind yet another fact; it is perhaps least easily seen to be expedient, not because it is unknown, but rather because it is too well-known.

It is the fact that many bodies exist together in space. Without this all the variety of relations among forces would fail forever to result in any activity or development. For things which are separated from one another are perfectly isolated, temporally as well as spatially. Newton's remark, that no one would be so lacking in philosophical judgment as to fail to notice this fact, reveals that he held this truth to be one which is intuited *a priori*. But in any case, it is also established by experience. All right, then, but is the bodies' existing together self-explanatory? Not at all. Rather, for someone who recognizes no ordering intelligence in the universe, the existence of even just two bodies together in space is an infinite, indeed an infinitely many times infinite improbability. Consider an infinite line on which two bodies are located but we don't know where. Anyone who supposed that they border on each other would be assuming something infinitely improbable. But the infinite improbability is raised to a higher power since the bodies must actually be located in a plane, indeed, in a three-dimensional space.[26]

So even presupposing all the other apparently teleological conditions of the inorganic world, all these forces would still lie fallow and lifeless if the one favorable circumstance among infinitely, infinitely infinite unfavorable ones were not really actualized.

Thus here, too, there is without doubt the appearance that the situation for enabling activity and development has been calculated.

189. We have said that the inorganic world, like the organic world, exhibits an appearance of teleology in the most marvelous way. And indeed it does so just as well considered by itself, as it does when considered in its relations with organisms.

The end we pursued in the preceding considerations was to demonstrate the former. And this alone would suffice to prove that the whole of nature is permeated by an apparent teleology. But the apparent purposefulness of the inorganic world becomes even more astonishing when we consider *its relations with the organic world.*

We have already touched upon this aspect in passing. And in fact, all the traces of apparent teleology which we have observed have significance from this standpoint, too. But something greater still remains to be mentioned.

Our astonishment has already been aroused by the fact that different materials found in the inorganic world are capable by reciprocal interaction of turning themselves into new, homogeneous bodies (as far as we can tell from appearances) having entirely different powers and properties. This is called chemical combination. But how much more wonderful is the fact that there are some inorganic materials which, under the influence of organized substances, can themselves be turned into organic and organized substances.

Here the contrast to the previous properties and capacities is far more pronounced, even in plants, and altogether so in animal bodies.

One need only think of an animal body's participation in the phenomena of sensation, emotion, instinct, fantasy, memory, even if these are not regarded, as many would have them, as direct functions of some part of the animal organism. In any case, they depend upon certain functions which only certain organs can carry out. And these organs and their powers are constructed out of the elements and the forces with which the elements are provided.

It certainly is wonderful that there are elements which are capable of such a transformation.

And in fact not all elements are. Only a few are used by organisms. But some of these are used by all organisms. If a single one of them were missing--e.g., carbon or nitrogen or oxygen or hydrogen--then there could be no organisms, and the conditions of the possibility of the whole, wonderful teleology of the organic world would be lacking. Doesn't it seem that there is a teleology here which precedes that teleology of the organic world, and which allows none of the elements to be missing that possess the wonderful properties by virtue of which they are able to transform themselves and contribute to the production of a living substance?

In fact, if it is not just the clock but also each of its elements (as, for example, the many-toothed little gears) which reveal teleology on account of their relation to the clock, then this is all the more true of the elements of an organism which are provided with many properties, most of them unknown to us, that are quite necessary if each element is to make its indispensable contribution to the organism.

And nature not only offers all these elements, but she also offers them in the proper quantities and in suitable conditions.

There is a huge quantity of nitrogen, carbon, oxygen, hydrogen, etc., in relation to others, say to gold. Anyone who's displeased by this should remember the king of Lydia! In truth, if nature did not provide those elements in such great quantities relative to the others, then they would not suffice for the requirements of the organic world.

And like the right quantities, there are other conditions required. First of all there is the mingling of elements in space. What use would nitrogen be if it were all concentrated in one celestial body? In addition to this there are the conditions of temperature, light, and so forth, without which those chemical combinations and decompositions, by means of which the elements become causes of organisms, would be impossible. In all these conditions inorganic nature gives the preparation and predisposition for the origin of organic life.

And so the inorganic world seems in a sense to bear the seeds and embryos of the living world. Or, according to a lovely saying of Schelling, it is like a sleeping world of animals and plants which must be reawakened to truly living activity by the action of organisms already awake.

190. It certainly appears to be a wonderful teleology! An yet I'm afraid I have obscured the phenomena in many respects because of the inappropriateness which adheres to every comparison. Only in one aspect is the relation between the inorganic and the organic like that between the sleeping and the awakened. The inorganic world proves to be not only passive but also active. "If the little grain of wheat does not die it remains, but if it dies it bears fruit a hundredfold," as it says in the Bible. Inorganic nature--earth, water, etc., works on seeds as much as they work on it. So one sees quite clearly to what a high degree it is true that not only the grain of seed but also the inorganic world is a kind of foetus.

And the lifeless world provides the material and the conditions not only for the origin of life but also for its continuing preservation. An organism is like an eddy renewing and preserving itself in the stream of the inorganic world. Anyone who considers this correctly will thus understand the whole intimate unity of the two realms.

And the inorganic world is conducive not only to the origin and preservation of their lives but also to the exercise of the functions of creatures. If, on the one hand, it is awakened by organisms, it appears here to do the awakening. Not, as has been said, for vegetative life alone, but also for sensitive and intellectual life. Light, sound, etc., awaken consciousness and the whole sensitive life, which in turn awakens intellectual life.

On account of this relation the inorganic world presents itself, to some extent, as a complementary member of the organic world, and the whole of nature, which includes both, is, so to speak, a larger organism. And again, those parts of this larger organism which are specifically called "organisms" in common usage, also stand in a kind of organic relation to one another; thus, for example, animals and human beings find their nourishment in other organic beings.

191. Such mutual inter-dependence [*Aufeinanderangewiesensein*] is revealed in yet another, often very remarkable way. It was found in England that a certain kind of red clover, which is cultivated there, thrived especially well in the vicinity of places where many cats were kept. The connection was pursued with the following result: There are bumble bees which visit these flowers and foster their propagation by spreading the pollen. Now these bees have as their fierce enemies the field mice, who, in turn, are under the surveillance of the cats. So it seems that indirect teleological relations in nature connect even the most distantly removed things. And it can be said with certainty that much concerning such connections is still unknown to us.

So we found ourselves reminded of what Aristotle said, that everything stands in some causal relation* or other to everything else, and everything also stands in some teleological relation or other to everything else.

It seems that everything works together organically, and not just the parts of a so-called organism in the narrower sense; also inorganic things with inorganic things, inorganic things with organic things, organic things with other organic things. When one follows the cycle of water or the cycle of air, which preserve themselves undiminished and with unchanged quantitative proportions even though they are absorbed in large quantities, then one has a hint of what we would find if it were granted us to see through all the hustle and bustle of nature and understand all the teleological relations within her.

192. But since this insight is denied us, let us content ourselves with what we are able to demonstrate clearly and have indeed demonstrated clearly, as I think, despite the limitations which time imposes on us. And this is, as we said in the beginning, that in the world, and particularly on the earth, which is best known to us, there are a number of objects which look entirely as though their existence and their operation have been ordered for the sake of a purpose which could have been ordained for them by no human understanding nor by any animal desire.

It is *as though* there were such a purposeful order, and at that, in the most different domains. Can we conclude on the basis of this, however, that there *really* is such a purposeful order? That is the important question in which we are keenly interested. But much as we long for an answer, I cannot yet begin the inquiry. For even as I raise the question I feel that a whole crowd of respectable men would bid me stop, since they would still veto even the modest claim that there is just the *appearance* of such a purposeful order. In order to judge the justification for this objection, we still have to complete our considerations concerning the appearance of teleology.

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* Which is obvious just on the basis of gravitational attraction.

II. OBJECTIONS AGAINST THE APPEARANCE OF TELEOLOGY IN NATURE

A. AGAINST THE APPEARANCE OF TELEOLOGY GENERALLY

193. You will not quite be able to comprehend, and neither can I, how, after so many facts such as those we have presented, one can still deny that the world at least looks as though there were purposes in her which are ordained not by human beings and animals but rather by a different understanding. But nevertheless, one may not deny the floor to any opponent, especially not in a scientific question.

So let us hear the objections.

194. I. "When you say there seems to be a purpose in nature, this is not correct, or correct only in a very limited and scarcely significant sense. At first glance, of course, we concede it might appear that way to many, indeed to all of us, but not upon closer consideration."

But haven't we considered the facts more closely, and wasn't it precisely the closer consideration which illuminated the apparent teleology for us?

"Then at least you haven't considered them rationally, otherwise the appearance would have vanished away. In some cases, we concede, it may surely appear as though there is a purpose, but not in all. Or if there appears to be a purpose in *all* cases--since you want to have apparent purposefulness in all domains of nature--still *not in every respect.* In many, indeed in most respects it does not appear. And therefore, even in those respects in which, when they are considered in isolation, a purpose seems to reveal itself, this appearance of purposefulness disappears as soon as one looks at the whole.

"If someone can tell me why there are bedbugs and lice or even intestinal worms (Cf. Littré) in the world, then I will accept the explanation for horses and oxen. If anyone can tell me why there isn't less gold for Rothschild and more for the Austrian or Papal treasury, then I will accept the explanation of why there is not more or less oxygen or nitrogen in the air.

"If anyone can tell me why this particular stone lies by the wayside in just this position and not turned the other way, then I will also respect what you say about the place of the earth and the position of its axis.

"If someone can tell me why sea water is salty, then I will also marvel at the teleology of its other properties. Obviously seafarers would be better served by fresh water.

"If someone can tell me, to turn to organisms themselves, why there is a spleen, for example, which we can excise from young foxes without ill effect, then I will also believe what you say about the apparent purpose of the eye, etc.

"Until then, however, I not only cannot concede that any purpose is actualized in the world, but also cannot grant even that any purpose appears to be actualized. For why shouldn't doubles turn up occasionally among many throws of the dice? And why shouldn't a word from some human language, or even a word from our mother tongue and one we're especially fond of, just happen to be put together once by countless letters of all kinds laid out in a row? No rational person, if he looked at the whole, would say that a special law of purposes even seems to govern this.

"So this is our objection and our protest, or rather, this is the least of it."

195. II. "In order to make it clear how very justified the objection is, we must supplement the discussion above with a second consideration.

"Suppose it had been demonstrated for a great number of cases of natural phenomena which seem at first glance to betray a teleology, and at that, for the most significant among them, that there is in fact no purposeful ordering. Would anyone lay any weight on the other cases, indeed, would anyone be able even to claim that the initial appearance of teleology is still there?

"Obviously not! Well then, let's go to the claim that there is an appearance of purposefulness, for in fact the demonstration just referred to has been produced.

"Thus there is no lack of counter examples, which make the significance of the highly prized teleology of the components of organisms disappear. Just think of the so-called rudimentary limbs and organs, the wings of the ostrich, false stamens, the eyes of the blind lizard (with all the parts and corresponding nerves), the stunted lungs of birds, the teeth of the whale which never erupt, etc. Or, to take examples from the most noble of all organisms, the human body: the muscles for moving the ears with their corresponding nerves and entire apparatus, the nipples of a man, and similarly again the organs of a woman, or traces of such, which have meaning only for the life of the male organism.

"In all these cases we have the same equipment which you find to be so teleological and in which you say only a blind man could fail to recognize the appearance of the most wonderful purposefulness: muscle and nerve for movement, the tooth, the eye, embryonic facilities for development, etc. And nevertheless it goes without saying that the alleged purpose is not there."

196. "One of the most important facts, tempting us more than any other to admit the appearance of teleology was, of course, the fact of instinct.

"We have this to thank, for example, as it appears in the form of the procreative instinct, for the continued preservation of all genera and species of animal creatures. It appears at the time when strength matures and so it is suited, if anything is, to arouse the appearance of teleology at first glance.

Consider, however--and this is just one example out of a thousand--the following equivalent of this apparently teleological instinct.

> The dog that licks your hand does not harm you with its saliva. But by means of a physio-chemical process (which is a puzzle to this day for the ingenuity of human science) there begins to develop a virulent principle which will bring death to the animal and to all those that are innoculated with it by its bites. And what happens? This new circumstance, in which the dog is provided with such a power, infuses it with the deadly desire to bite precisely so that the cause which makes the poison may take care at the same time in every respect not to disappear without having done some damage. And when the one organism is killed another will sustain the cause of the poison. Now then, what shall we say about this extraordinarily purposeful cause?' (Littré, Introduction to his book on Comte)*

"It will surely be with difficulty that anyone marvels here at the appearance of teleology and at the instinct for such a drive to reproduce. But then it may also become clear that this is not to be marveled at elsewhere; for the phenomenon is quite analogous in the two cases.

"So that is the two-fold argument which may serve to open the eyes of those who call others blind for refusing to acknowledge the appearance of teleology.

"It is not true, we say, that there is the appearance of such a teleology as you could make the foundation of your theistic proof, except perhaps for someone who considers things quite superficially. For a thinking person the appearance melts away directly for the reasons mentioned.

"I. Because in many, indeed in most cases we encounter no appearance of a purpose, or it presents itself only in a few respects. And thus as has been shown, the initial appearance of teleology resolves itself into isolated points.

"II. Because to a large extent for the cases in which one might be most inclined to marvel at an apparent purposefulness it can be demonstrated that there is no purpose. Thus for these remaining cases the mere probability of a purposeful order is naturally dissolved once again."

B. OBJECTIONS AGAINST THE APPEARANCE OF A SUPERHUMAN TELEOLOGY

197. Many of you may have become alarmed by this attack on the achievements of the investigations we have managed to carry out so far. And yet we have still to see the full force of the opposition against us.

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* I.e., Littré's *August Comte et la philosophie positive.* (Tr.)

We have said not only that a purposeful order presents itself, but also that this purposeful order seems to surpass by far all the achievements of human ingenuity. This is a point which seems to our opponents to leave us wide open and to be most completely refuted.

"Even granting that there is a certain appearance of purposefulness in the works of nature, still it is not such as to allow us to suppose it is due to a more-than-human cleverness. Rather it indicates a much lower degree of intelligence. "Measured by the standard of human intelligence," says Albert Lange, for example, in his *Geschichte des Materialismus*, the "most characteristic means" which nature employs is "such as to be on a par only with the merest accident."

I. Regarding one example, which tends to astonish more than others on account of its purposefulness, and which we dwelt upon in some detail, namely, the preservation of species through the continual reproduction of new and similar organisms, A. Lange attempts to establish this:

> "If," says he, "a man took a million rifles out onto a great moor and fired them off in all directions in order to shoot one rabbit; if he bought 10,000 arbitrary keys and tried them all in order to get into a locked room; if, in order to have a house, he built a city and then left the excess houses to the wind and weather; then nobody would call such a man purposeful, still less would anyone suspect any higher wisdom, hidden reasons and superior cleverness behind the proceedings. All right, so let us stop speaking of such things in nature.
>
> "But anyone in the natural sciences who means to take notice of the principles of the preservation and propagation of species will find there is an enormous waste of the seeds of life on all sides.
>
> "The destruction of the seeds of life is the rule; development 'according to nature' is the special case among thousands, it is the exception. And this exception constitutes that nature at whose purposeful self-preservation the short-sighted teleologist marvels. Consequently its formation is 'an accident';naturally not an accident in the sense that 'the universal laws of nature' do not govern it: but it surely is an accident in the strictest sense of the word when we consider the term in contrast to the result of a manlike, calculating intelligence.
>
> "Still, we cannot fail to appreciate a certain necessity in the larger outcome even when the particulars are all accidental. (As for example if a misaimed shot, or even a bullet fired into the blue, were to hit the center of the target.) Among countless cases there must be favorable ones, too, since they really do occur and everything real is brought about by the eternal laws of the universe. Thus what has been said does not abolish every teleology so much as it yields an insight into the objective nature of the purposefulness of the phenomenal world. We see clearly that in its particulars this purposefulness is not a human purposefulness. Indeed we see that, as far as we now understand the means employed by nature, her purpose is by no means ordained by a higher wisdom. Rather she employs means which make decisions according to their logical proportions, and clearly they are the humblest means we know. So this is about what remains of the appearance of teleology for one who knows the context of the phenomena. Such a minimal teleology, however, is not much to begin with for someone who wants to

> prove the existence of God. Rather the material just covered, which has only been brought to light in recent decades by precise investigation, seems to have confirmed a part of the much abused world-outlook of Empedocles. He thought that the more purposefully constructed creations, capable of preserving themselves, emerge gradually and by accident from an ocean of the birth and destruction of non-purposeful forms.
>
> "So the result is that teleology belongs to the realm of poetry. But it is simply and definitively to be cast out of the realms of natural science and critical philosophy."

198. What Lange expresses here is not a view peculiar to him alone, rather many scientists, with him and before him, have raised the facts he mentions against the teleologists in the same way. And among these some have even tried to show in another way how far the apparent purposefulness which one tends to marvel at in the works of nature falls short of the rapturous high praise which is lavished upon them.

II. "If anything at all is suited to give rise to the appearance of purposefulness then without question the eye is, and this is why it is the most favorite theme of the teleologists. From the nerves to the eyelashes. But even the eye, and indeed (apart from any individual deformities) the normal eye exhibits so much imperfection that it would hardly be a credit to a being of super-human intelligence. And it would be laughable to find in the eye the apparent work of an infinite understanding, as the teleologists attempt to prove it is.

"It is imperfect in that it cannot adjust for every distance. The apparatus for making that accommodation is imperfect. There is a narrow space between the boundaries of the sphere of fully clear vision, as compared with the space which it must penetrate and command.

"The eye is imperfect, further, in that it is not really achromatic. This is why colored borders are formed around the images of shining white objects. By using chromium and flint glass, Frauenhofer has made instruments which correct this. Our eye goes without such precautions.

"And yet the colored borders occur precisely in the white sunlight, into which the eye generally looks, and likewise in the variety of so-called polychromatic lights.

"The imperfection of the eye is also exhibited by the fact that it sees the different parts of the visual field with varying degrees of clarity. The so-called yellow spot on the retina is the place of keenest vision. All these flaws show that the eye is such an imperfectly fashioned instrument that Vogt said, if an optician delivered one like it to him he'd throw it down at his feet. So how does it look now for the appearance that there is an infinitely superior intelligence who knows the laws of nature better than we do? At least as far as the knowledge of optics goes, that intelligence has already been surpassed by us. And yet the eye is the great pride of the teleologist. How much less do the other parts of the body provide arguments for a wisdom such as he would like to prove.

199. "But why do we trouble ourselves and seek in the profundities of science for arguments against the appearance of such a teleology as would be appropriate to the hand of a divine, of an infinite and omnipotent intelligence? The most devastating refutations of it lie ready at hand.

III. "There must be nothing which can frustrate the ends that such a mind sets for itself. All right! It is evident that this cannot be said of the ends that are supposed to be set for nature. Who doesn't know that flowers are quite often destroyed by storms or frost, that unripe fruits fall to the ground, that a flash of lightning annihilates a tree in full bloom, and that mankind's pleasure-seeking plunders rosebushes? In order to know of these things, one need not know of the millions of failed attempts mentioned above among which only *one* is successful. Who doesn't know that it is the same with the eggs of animals and the human foetus in the womb, which often dies in the mother organism before there is any activation of the organs concerning which it is nevertheless said that they are determined for activity?

"In all these cases the so-called end is miscarried. Furthermore, who doesn't know something of the many cases of deformation and diseases of all kinds which mar beauty and make the use of the limbs impossible?

"Who doesn't know anything about the pain and suffering in the world, about the great wickedness of human beings, who are nevertheless supposed to be determined to love the good? Who doesn't know anything about the successes of evil men, about the many temptations which lead to wickedness and how vice is cultivated? These kinds of moral monstrosities are in fact not rare, or at least not as rare as is the realization of the moral ideal. On the contrary, one can say that even the virtuous show themselves to be weak in many cases and deviate from their true goal. 'A righteous man sins seven times a day.'

"So everything is full of disorder and inappropriateness, i.e., of violations of the so-called purpose on a small scale as well as on the large scale, in the life of an individual as well as in history. For although the teleologists see history as the successive unfolding of higher and higher perfections, it is actually a continuous series of the bloodiest atrocities and the most detestable criminals.

"Let us look at antiquity. Consider even the Jews, the Greeks, and the Romans, on whom the eye of the historian can still rest with a certain wonderment. What does their history show us? The Jews have their holy books, which bear a continual witness against them. The Greeks had slavery and immorality, pederasty, deceitful diplomacy; internally they had no solidarity, and externally there was the well-known Greek trustworthiness. Also their intellectual mistakes were great. Even when they flourished politically their religion was a polytheistic superstition;

and after the decay of this polytheism, what little there was of moral culture also decayed and with it the art which had thrived chiefly in service to the religion. And the Romans! From them we have inherited 'the Law,' but their own history was a series of the most unlawful outrages and faithless perfidies. When the skeptical philosopher, Arcesilaus, had come to Rome from Greece, he held lectures on justice for two successive days. On the first day he spoke in favor of it, and on the second against, and *this* with arguments very well suited to make an impression on his listeners. That is, he showed them that from the standpoint of justice there was no alternative for the Roman state but to yield up all that was annexed over the course of centuries.

"But it would be better to remain silent concerning recent times. The nations have adhered to moral law neither inwardly nor outwardly.

"Who still dares to maintain that the ends for which it is said nature strives are never missed? Who cannot see that the opposite is rather the almost universal outcome? And that the divine mind must have miscalculated most of the time?

"So it cannot be granted that there is any appearance of teleology which points to a super-human, intelligent, infinitely perfect designer."

200. IV. "The same conclusion is reached from yet another angle. The infinitely perfect being must also be thought of as morally perfect. And the government of the world does not reveal a superior goodwill. This is altogether clear when the superiority of the designer's understanding is defended; for if everything is supposed to be planned and willed by him just as it happens, then he must have been aiming for something a thousandfold removed from the good. Indeed, the disorder itself must have been his favorite of all possible orders. The rational being, to whose work many would trace the appearance of teleology, must be not only intellectually but also morally far beneath the standard to which the best human beings rise.

> "Millions," says Lange, "hover between life and death, so that a few individuals can develop themselves. Human reason knows no other ideal than the preservation and perfection of life as far as possible, once a life has begun, bounded only by the limitations of birth and death. To nature, exuberant procreation and agonizing annihilation are just two forces that work in opposition, seeking to balance one another . . . Compassion, the loveliest flower of earthly organisms, breaks forth only at isolated points, and even for the life of man it is more of an ideal than a common motive."

V. "We speak of the harmony of all things. We say that in the world it seems that everything is teleologically designed for everything else. Isn't the truth exactly the opposite?--Everywhere we find, not unity and harmony, but contradiction and disharmony. The struggle against our so-called fellow creatures is the universal solution to it. Animals struggle against animals, animals against plants and human beings against both, and they all struggle, too, with inorganic things. They mutually make enemies of one another and destroy one another. And the struggle is necessary, it is in keeping with our so-called duty. Everything is born for hatred. You say that everything is for everything else. But no! Everything is against everything else. The world, far from being the best possible, as many teleologists and theists declared in blind enthusiasm, is rather the worst of all possible. War, and not peace, is the father of life; of the most unhappy life, of course. Either nature fails, or it succeeds by evil means. In each case the opposite of the good is realized, unless one takes the view that the end can justify the means. And after all this there is still supposed to be the appearance of a kind and wise understanding? No! One could more easily be put in mind of a Manichaean principle of evil. To a rational person, though, it appears to be an accident which must have produced what is on the whole such an overwhelmingly sad picture, since many more apparently unteleological forms than teleological ones are possible.

"But if many are of the opinion, nevertheless, that the appearance of purposefulness and of the rule of a kindly understanding would remain, still the more reasonable among them are those who hold it to be very limited ('extremely limited' says Mill). The designer, as good things in the world usually are, would be a weakly principle; and another, stronger evil principle must be opposed to him, as Ahriman to Ormazd, and must very nearly have subdued him completely."

This is the result. It seems we must be converted to pessimism, although at first we had taken flight to a more idealistic world-outlook.

III. REPLY TO THE ARGUMENTS AGAINST THE APPEARANCE OF TELEOLOGY

A. THE OBJECTIONS TO TELOLOGY IN GENERAL

201. The attack was twofold. One part was directed *against the appearance of teleology generally*; the other part primarily against the appearance of a super-humanly sublime teleology such as we have claimed to find in nature. The infinite sublimity of it was contested from an intellectual, as well as an ethical, point of view. In the end, the result of both parts of the attack was the same.

I. Let us first of all examine what was maintained in the first place. There was supposed to be no appearance of teleology, despite everything we've pointed out in the most diverse realms of nature? And why not? Above all, it was said, because in most cases--indeed, in all cases in most respects--we are unable to specify any purpose.

202. This is a fact which is often presented as a refutation of the teleological argument, but usually so crudely that it scarcely deserves a reply. "For many things we are unable in many respects to specify a purpose, therefore nothing has a purpose in any respect whatever"--that is an inference which seems to be formed according to rather bizarre syllogistic rules.

1. One could conclude, at the very most, that many things have no purpose.

2. But even this follows only upon the presupposition of a degree of knowledge which we quite naturally cannot lay claim to. Even the efficient cause is in many cases unknown to us, but it is more nearly accessible than the purpose is.

At any rate, in the way it is often raised the objection is without significance. I regard it exactly as I would a defendant who would exonerate himself in the face of three witnesses who have caught him red-handed by producing nine others who didn't catch him. (When Schopenhauer requires that the teleologist give a reason why sea water is salty, his argument has a similar impact.)

203. But the fact appealed to in the argument we have presented here is exploited in a different way. And in this other argument--it cannot be denied--something more impressive is said.

All the phenomena of the world as we know it are put together, those which might give rise to an appearance of purposefulness in isolation, and those in which no purposeful order is recognizable. Attention is called to the fact that the number of the former, however large considered in itself, appears small in the sum total.

And then it is claimed that, regarded in this context, the appearance of purposeful order disappears. Of course, doubles will be thrown once in many random throws of the dice; and a few intelligible words, among countless combinations of letters which make no sense to us, seem to be no more rationally arranged. We prefer simply to believe in mere chance, and not lay much weight on the possibility that the other combinations might also have a rational significance in some language which is unknown to us.

204. Thus understood the objection would in fact give us pause, if the proportion in our case were really the same as it is for dice and random letters.

A. If there were very few things which, considered in themselves, gave rise to the appearance of a purposeful order, then the appearance could disappear in the face of a much greater number of cases which gave no indication of purposefulness. As, for example, if we found a fairly regular sphere of sandstone left behind by a flooding river together with many differently rounded stones of the same kind.

B. But surely even here there remains a qualification to be added. This won't be the case under all conditions, but only when the number of possibly purposeful arrangements stands in a finite and more than negligible ratio to the number of possible arrangements. On this basis, for example, the appearance of purposeful order would not vanish if, instead of that spherical stone, a well-formed stone finger or hand had been found somewhere, or even an entire, well-modeled statue or a sharply defined relief, even if it was found on an island apparently the first time anyone set foot there.

205. Now the examples of the random letters and the dice are of the first type. But our case is quite different from both of these.

A. Above all, we have here not just one or two, but countless instances of apparent teleology.

And by no means can it be said that these are to be found among an exceedingly greater number of other instances which exhibit no purposeful order. In order to make this clear, we must make a twofold distinction: 1) Cases in which we can specify an *apparent purpose*, and 2) cases in which we can specify an *apparent function*.

It is important to keep these two concepts well distinguished.

As for purpose, it is actually not, as our opponents maintained, merely certain that we are unable to specify the apparent purposes in many respects, but we must also say that we are really never able to know them, except insofar as we see them to be achieved already or are certain that they will be achieved.

206. The reason is to be found in something which we have touched upon in earlier discussions, namely, in the variety of forces and capacities with which each thing in nature is provided, and in the multiplicity of possible applications connected with these.

α) Things have capacities for many states which are mutually exclusive, e.g., for being warm and cold; for being in this place and in that; for rest or motion; for this or that chemical combination, etc.

β) And they have many capacities of which some must lie dormant if others are to be developed. Such as the capacity to be a tightrope walker or a philosopher.

207. Thus it is throughout the realm of inorganic nature, and so here we do better to specify an apparent purpose in general rather than in particular (as, for example, in saying that the reason why there is hydrogen in the world is so that it can combine with oxygen to form water). We can do this in particular only insofar as we restrict ourselves on the one hand, as mentioned, to what is already actualized, and on the other hand to what holds uniformly for every kind of application. In this sense Aristotle says that nature has the species in view; and it is the most universal teleological relations that would remain undisturbed throughout (*Metaphysics*, Book Lambda, Chapter 10).

Other than that we can only speak of hypothetical functions, or say perhaps of a natural product which is suitable for many things that its purpose is to be useful for this and that, in this way and that.

208. But it is no different in the organic realm. We can only say in general that eyes are intended for vision and flowers for bringing forth fruit. For here, too, a variety of other uses are possible and thus also actual in individual instances, and the use for vision or for bringing forth fruit is itself just one individual instance among many.

209. Of course, one can say something about organic beings which one cannot likewise say about the others. They possess the capability for many things which are mutually exclusive such that each seems to be a conditionally assigned task, but of these there is one that we can thus designate as the *apparent function in the sense of being superior*.

1. That is, in many applications a living,organic being is not used any differently than a lifeless and inorganic one with which it does have much in common, namely the elements (e.g., flowers and leaves may be used as fertilizer). An organized body appears on this consideration to serve among organic things generally somewhat as a citizen does who has mastered a particular craft but has other tasks in common with other people. For example, he does military service, for the sake of which, in time of need, he sets aside the activity in which his peculiar skill is evidenced in order to do the common task in which he does not excel over others.

2. In other applications a living, organic being is indeed used as an organic thing, but not as an organized one (e.g., when it is used as food).

3. Again, in other applications its organization is a consideration, but it is not used as an organized thing which actively uses its organs, but rather as a static thing (e.g., a flower which is dissected and analyzed by a botanist).

4. Finally, in other applications it is used as an organized body which deploys its power in active life. As in the forming of fruit.

Considered directly and in themselves, its achievements in this fourth kind of application are the highest. They are the ones which would be least possible to achieve without the whole artful design. They are the ones in which the organized being *is most perfect considered in itself*, which serve its perfection the most, sustaining and increasing it. It is only in these highest achievements therefore that we find completely (or at least, essentially) revealed *what a work of art the organism is as an organism.*

These achievements are also the ones at which drives and instincts aim in the case of conscious, organized life, and thus we say (by analogy) that in unconscious living things there is a striving directed toward them. This striving follows a law set down by nature, and insofar as this seems to derive from an intelligence, on account of the apparently purposeful order of the whole, we can say with greater significance (κατ' εξοχήν) that a living being, that is, an animal, has taken on a task or function which it seeks to carry out.

210. But "function" and "purpose" are different. Undertaking to do something is not the same as willing that it be done. (Consider a company which receives a command to storm a hill whose peak it cannot possibly reach, or a messenger who receives the counter command which had been intended from the beginning.) If we mean to imagine an intelligence of such sublimity as the signs of teleology we've wondered at seem to indicate, then we must assume that it has completely thought through

and designed the plan of its work from the beginning and not merely in certain general outlines. The plan must be due directly to this intelligence, down to the smallest detail, and this is not contradicted by the fact that many parts of the plan are carried out indirectly. For even though it could do everything directly, yet it would deprive its work of one of the most superior perfections if he did not allow it to act itself,and to further its perfection by acting, in a way indicated from the beginning by its plan.

In this indirect carrying-out of the plan it is not necessary, indeed it is not even possible, that knowledge of the plan itself be imparted to what is used as a means to it. This is not the case for a hammer of which the smith makes use, nor for the soldier who is led into battle, indeed to a certain degree not for the subordinate officers either. They receive orders to do something; but the ends in view remain concealed, and anyone who sees them in action will be able more easily and more often to infer what the orders are than what the actual purpose is. So in nature, too, it is one thing to know the purpose and another to know the task or function. The former is concealed from us, but the apparent function is often quite identifiable. The purpose is always unconditional and uniform, while, as we saw before, we often can speak only of a variety of tasks, each of which seems to be given only for a certain instance.

211. These remarks are of some importance. They will prove useful in answering various objections. But first we will have to dispose of an objection which springs from these very remarks.

That is, someone could say: According to our analysis we can determine the (apparent) purpose in nature only in cases so rare that even the phenomena concerning which one is most inclined to claim such knowledge do not for the most part constitute an exception. For this very reason it is inconceivable how anyone can still maintain that an appearance of purposeful order is undeniably present in nature.

The answer is that we can still specify the apparent function, if not the purpose. *But the function,* different though it is from the purpose, *is still inconceivable apart from some purposeful order.*

Thus each of the various applications of living and nonliving beings gives rise to the appearance of teleology; and this is especially true of the living ones in their highest mode of application which we designated their apparent function in the most preferred sense of the word. But the cause which so frequently hinders us from specifying an apparent purpose as well as an apparent function, namely, the possibility of a variety of applications, is certainly not something which can be condemned as being unteleological. Rather, precisely this variety is to be marveled at as teleological, and this is why we referred to it earlier as something wonderful. Without it the rich beauty of nature would be transformed into a dreary and tiresome sameness which, despite the constancy and steady uniformity of the laws of nature, is avoided now and turned to its opposite in the most perfect way by no other more preferable means than the disposition for many and various different developments.

212. B. So it remains true, what I mentioned in defending the appearance of teleology against the present objection, when I said that above all we have not just one or two but countless instances of an apparent teleology, and that it can by no means be said--as our opponents would have it--that such instances are to be found among an exceedingly greater number of instances which bear no trace of apparent teleology.

In addition, there is the second point to be made (and this is decisive), that for many, indeed for most, of these proportional relations the conceivably purposeful dispositions are numerically related to the total number of possible dispositions as a finite quantity is to an infinite one.

213. Several examples by way of illustration: Such as the fact that bodies exist together in space. (If this is not supposed to serve the purpose of constructing the world, then it must appear infinitely, and many times infinitely improbable, since even on a line infinitely many more positions of complete isolation are conceivable.) Or, consider an organism, indeed a part of an organism, a part of a part, e.g., our eyeball and its parts, the transparent cornea, the opaque white, the crystalline lens, the ciliary processes, the anterior chamber with its aqueous humor, and the vitreous body, the choroid membrane, protected by the white of the eye and covered inside with a dark, mucoid pigment, the iris with the pupil in the middle, a circular hole for light which can contract and expand, the optic nerve, which, as the retina, spreads itself over the choroid in innumerable delicate branches, the lens capsule with its many capsular layers, enclosing each other and approaching a spherical shape as they get smaller. And now just think of its wonderful achievements! And think how impossible they would be without the remarkable physical and chemical characteristics of the component parts, without their peculiar shape (blind chance would offer infinite room for variation of this in three dimensions), or again, without the individually tailored alterability of shape (e.g., the convexity of the lens in accommodating for distance, which is still in some respects entirely enigmatic). Consider how the whole maintains itself through nourishment, and how the parts must reorganize themselves when growth occurs. Consider how countless other positions are conceivable for each of the individual parts, but these would make impossible the peculiar achievement of serving as a visual apparatus. And in addition there is the connection with the brain and with the nerves governing motion, the service performed by the muscles, and the external protective organs, etc., etc. Entire books have been written about the eyeball and yet they haven't exhausted the subject. What concerns me here primarily is the idea that, without regard to a particular function,

there would be infinitely many times infinitely many possibilities of completely unpurposeful arrangements conceivable for all these parts.

But something similar holds for hearing, etc., for instinct, for the media of voluntary movement, etc. What was that about the improbability of an accidentally intelligible combination of six or twelve of our twenty-four letters?

214. We see that the comparison is completely inapplicable. The very nerve of the proof is cut out, since in proofs of physical certainty it is found in the relation of probabilities, in the infinite improbability of a thing's occurring.

Rather (to return to the comparison I used earlier), it is more as though one were to find a few first-rate statues among many boulders which were apparently unhewn, or formed for some purpose one cannot understand, and as though this happened someplace where no human being could ever have been, e.g., on the moon. The appearance of purposefulness would undeniably continue to persist as powerfully as ever. If it were inconceivable that the shape of one stone was artfully executed, unless the others, in which we notice no purposeful design, also served some purpose, then, if it seems possible at all that the purpose could escape us, we would infer with every confidence that this particular stone also has a purpose which is unknown to us. Here we approach nature in the same way Socrates did the obscure writings of Heraclitus. "What I understood was good," he said, "and so I conclude that what I did not understand was no less excellent."

215. We have less reason to let the appearance of teleology in nature be obscured by means of that inappropriate comparison, the more the loveliest of the crude works of antiquity and all our art fall short of the works of nature.

There is no difficulty whatever in assuming that there is a purposefulness here which is concealed from us. It is precisely the greatness of the teleology on the one side that agrees so well with its secrets on the other and makes them conceivable, indeed allows them to be expected *a priori*. If what we marvel at is really the work of an art so superior to all human art, and of such an incomparably higher insight and science--as it appears to be--then it can only be that in many things we are unable to determine their aims, unable to guess their designs.

216. And this the more so the more perfect the teleological development is, the more each part is determined not for itself but for the whole. Only a knowledge of the aims and designs of things would give us the key to an understanding of them and a standard for calculating their perfection, a standard, obviously, which we are not given, we who survey but a small span of time and space.

For this reason the comparison with random letters, as it is given, proves to be particularly inappropriate. It would be more appropriate if it were added that the series of letters belonged to a language with which we're only imperfectly acquainted, knowing very few words. Then one would expect from the outset that many of the series would be unintelligible to us, and the appearance of purposefulness would not be removed at all.

217. So the appearance of teleology is obviously not in the least diminished by the great number of things for which we cannot give a sufficient and clear explanation from a teleological point of view, rather they confirm the suspected relative impotence of our understanding. And so, however undisputable our lack of knowledge is concerning many aspects of purposeful relations, the objection has been proven to be not only untenable, but completely self-defeating.

218. II. Let us go over to the *second* attack which was likewise directed against the appearance of any purposeful order in nature.

It was said that exactly in those classes of phenomena which most seem to betray teleology at first glance it is possible to recognize forthwith that there is no purposeful order. And thus, naturally, the initial appearance of teleology is destroyed in all the rest of the cases, too. As examples we drew from the class of apparently teleological body parts the so-called rudimentary members, the wings of the ostrich, false stamens in flowers, the eyes of the blind lizard, the stunted lungs of birds, the teeth of the whale, the ear muscles in human beings, the nipples on a man.

Then, from the class of instinctive phenomena, the rabid dog's drive to bite, by means of which it propagates the poison which has developed in its saliva--this is analogous to the reproductive instinct at the time of maturity.

219. Of course, these facts are shocking at first blush. But it is not true, as the objection would have it, that on account of them the appearance of teleology in the relevant class of phenomena is removed generally. Rather one has the feeling of something strange, somewhat as if a phenomenon quite similar to a series of observed phenomena were to constitute an exception to some law which had proved to govern all the other cases. One does not for this reason immediately deny the validity of the law for this kind of phenomenon. Rather one examines the new phenomenon more closely, in order to see whether it is really of the same kind as the others, and if so, whether it is really an exception to the law.

220. Now if this is done in our case, too, then upon closer consideration the puzzle is solved.

Where Littré's rabid dog is concerned, the result of the examination is that it is *not the same kind of case*. It is easy to recognize that here there is not an appearance of teleology similar to what there is in the instinct for procreation.

a) Why does Littré himself say that no one would want to assume a natural, purposeful order here like what there is in the procreative instinct? Obviously because what proceeds from the dog's bite is not something which bears the appearance of a work of art worth marveling at, as a created organism does, rather it exhibits only corruption and destruction. The effect is nothing but an infection, the communication of a disease. But because the results differ thus, the whole character of the phenomenon is different. To destroy an artful order is easy, to produce order is hard. In order to create the order in an organism the instinct for reproduction operates as one means together with many others; it occurs precisely where there would otherwise be a gap in an artful series. None of this holds for the dog's urge to bite, and therefore it is far from being a phenomenon with a similarly great appearance of teleology. At best the process of infection, as the expression indicates,* is to be compared to the way fire is propagated, and not to the propagation of plants and animals.

b) The difference between the dog's urge to bite and an instinct, which it is said to parallel here, appears in yet another respect.

The drive to reproduce, like the drive to obtain nourishment, is quite a specialized drive, so that it appears as though nature has given instruction on certain necessary functions of interest to the preservation of life, even prior to all experience. Obviously the simple desire to bite bears very little resemblance to this.

c) But if there is some such resemblance to a certain degree, then there remains something which, despite all that was said, preserves the appearance of teleology, and this has its basis in real teleology. The connection is that dogs have the urge to bite when they are angry, and this is teleological. The result is that every disease which makes the animal mad impels it to bite, and this is also the case with the disease which is communicated by the saliva. Consider, by way of comparison, a rabid ox: it will butt, but not bite even though its saliva is poisonous, too. A hydrophobic human being will scream and thrash about. Thus the whole phenomenon is a mixture of a purposeful order and a pathological condition. (Later on we will have something to say about how such things can take place in a teleologically ordered world.)

So we turn the argument against Littré: If one considers the facts in context, then the appearance of a particularly artful teleology in the biting of a mad dog will disappear. But the appearance of teleology persists in the reproductive instinct, which presents itself even at first glance as something quite different and marvelous.

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* The German word for "infection" is *die Ansteckung*, and the verb, *anstecken*, can mean "to set on fire" or "to kindle" as well as "to infect." In English we occasionally speak of a disease or disorder as being or involving an "inflamation." (Tr.)

So the phenomena are in fact not of the same kind.

(I naturally do not want to deny that every dog bite can have a purpose, too, and does; I only wished to dispose of the apparent similarity of function, where the one is as directly aimed at corruption as the other is at the achievement of a perfection.)

221. If in the case of the rabid dog the objection of our opponents was examined and answered primarily by demonstrating the dissimilarity of the phenomena, then this is to be done in the case of rudimentary members rather by *subsumption under a principle.*

Let us examine one of the aforementioned examples in particular.

It was said that a man has nipples and milk glands, but not for nursing (although Humboldt tells of an Indian man who nursed). Similarly a woman possesses imperfectly developed organs which are of importance only for the vegetative life of the male organism. Why is this? What explains it is that the zygotes are alike. (A distinction of the sexes first appears during development.) But the fact that the zygotes are alike certainly seems very teleological as does the sharing of a common design generally. Here it has the result of a special division of labor between the sexes, the outcome being a perfected accomplishment for both (marriage). Apart from the development of the two sexes from the same initial design, there actually would not be two sexes but rather bi-sexual beings, as in most plants and many animals, if not even lower forms of reproduction such as parthenogenesis or asexual sprouting and division. The most perfect of all is obviously the condition in which the sexes are separate.

The presence of such rudimentary members is connected as a necessary consequence with this common initial design. So it is teleological to let the man have nipples because their formation and development is teleological in the woman.

222. With this we now gain a little light to shed on the other cases. The phenomena are analogous, and so the explanation will also have to be analogous.

Indeed you know that modern zoology has put forth the theory of evolution, according to which different species, even different genera, have a common origin, and many daringly go so far as to posit one for all living things. This theory, the so-called theory of evolution, has been advocated especially by Lamarck, and recently and most successfully by Darwin. One can say it is as good as universally accepted and established for all time. The most powerful arguments are in favor of it, quite apart from the phenomena we have just considered.

1. "Relatedness" has been held to support it, i.e., the similarity of different species which constitute a genus, of the genera which constitute a class, and the like. This is in fact a strong argument for a common origin, though perhaps not as strong for a common physiological descent.

2. But relationship and divergence give stronger support, especially as they appear in the areas of geological and paleontological research.

a) When we compare earlier species with present ones, it is apparent that none of the latter existed then and none of the former still exists today. Only a relationship appears, and so the question is raised: Are the earlier ones supposed simply to have perished, and the later ones to have emerged absolutely new from the inorganic matter? Or is it not more plausible to assume a causal connection between the generations?

b) What is already so obvious becomes much more obvious, indeed approaches an overwhelming probability, when one sees that there have actually been not only different species present prior to now, but successions of them. Thus we can construct series approaching likeness to the present species by degrees. So we would have not two species of flora or fauna without a causal relation (if we wanted to reject the theory of evolution), but many of them, and steadily approaching the characteristics of present species, which would be improbable in the highest degree.

c) Likewise paleontology reveals intermediate forms of old species, which couldn't be explained without the theory of evolution.

3. In addition to these facts there is the geographical distribution of present species as well as of historical ones in relation to the present. When we compare species of animals which were present earlier in a particular place with those now living there, we find they are more similar to them than to species of other regions.

4. Furthermore, the facts of the history of individual development also support the theory of evolution.

α) We find greater agreement of different species in the earlier stages of their development, such that their embryos are more easily confused.

β) We find that higher species go through phases in their development which others have also reached only to remain at that stage.

γ) Franz Müller and Ernst Häckel have proposed a law which Häckel called the fundamental principle of biogenesis. It is connected with the following facts. When we compare the succession of species to the successive forms in the development of a single individual, we notice a certain agreement of the two series. This led to the idea that the developmental history of the individual is to be read as a short and simplified repetition, so to speak, a recapitulation of the developmental course of the species.

5. Moreover this is where the fact fits in that there are rudimentary members, and especially the observation that these are sometimes missing in the developed individual, though they do appear in a phase of development only to disappear again.

6. The factors with which the evolutionary hypothesis must reckon are by no means foreign to experience, and so its practicability is not at all to be doubted.

Above all we come upon the fact of variability in general. It leads to the formation of species. The characteristics formed intensify gradually, and this continues so far that one cannot specify a definite boundary which cannot be crossed by small variations in the same direction.

The vagueness in the limits of a single species agrees with this, and frequently appears to span an astonishingly far-reaching interval of time.

7. Then in addition there are in certain cases more noticeable, sudden variations, such as occur in the transfer to another climate or other changes in circumstances. (For example, when oysters are taken from the North Sea to the Mediterranean.) Also, dimorphism and polymorphism within the range of forms of a species (of which sexual dimorphism is one of the most important)* lend strong support to the idea that sharp variation is possible.

223. I dare say that today the evolutionary hypothesis has entirely won over the experts in the field. And the presence of rudimentary members in animal species as well as in the sexes, to which the objection called attention, is to be linked with the common descent of different forms. The presence of rudimentary members is teleological in both cases, as are common initial dispositions generally. And it has often been said, certainly with justification, that the theory of evolution presents a more wonderful picture of order in the world than does the assumption that each species was created individually. The more things there are in creation which are brought about indirectly the more perfect creation seems to be, such that in metaphysics it has even been established as a cosmological law that what the creator of the world can achieve indirectly

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* The sexes are often very different and yet grow from the same seed.

he never effects directly. There is something grand in the intimate connection of all with all. If its classificatory system has genetic significance, zoology acquires an incomparably greater charm.

(Many have scruples against the evolutionary hypothesis on account of human beings--for all other living things they like the idea, but not in this case. I see this as a mistake, and believe that not only theistic philosophy but also biblical faith can somehow be reconciled with it.)

224. So the presence of rudimentary members seems to be sufficiently justified from a teleological point of view. The members of an unborn child are teleological because later they will become teleological. Likewise, rudimentary members are teleological because they once were teleological, or more precisely, because either they themselves or the dispositions from which they stem as consequences, once were teleological.

If someone asks why they haven't been eliminated, the answer to be given is:

1. Nature does not make arrangements to no good purpose. The lack of rudimentary members would be, so to speak, a superfluity.

2. It would be too bad not to have them, for they are souvenirs of history, valuable signs of the developmental course of organisms.

3. They are valuable, too, from an aesthetic point of view. They are often very charming, and even the analogy of all with all which they exhibit is something beautiful, an adornment of the world's orderliness.

4. Besides, even if they do not perform the function of their analogous members, still they are not without any function at all. Zoology shows a multitude of other applications for them; and if these useful functions are not as artful and capture our attention to a lesser degree than those of fully developed organs, still something similar may be said for them as for a flower which fails to bear fruit but which does not get lost in the household of nature.

B. REPLY TO THE OBJECTIONS AGAINST THE APPEARANCE OF A SUPERHUMAN TELEOLOGY

225. We now come to the second class of objections. Granted, there is a certain appearance of teleology, but not one which lets us suppose the world to be the work of an intelligence far surpassing the human, of a divine intelligence.

Here, too, there are a variety of arguments to examine.

I. The first was the one which is put forth, among many others, by Lange in his *Geschichte des Materialismus* [*History of Materialism*]. He calls attention to the *extraordinary waste of vital germs* in the process of reproduction, and draws the conclusion that the purposeful self-preservation in nature, which the teleologist shortsightedly wonders at, does not manifest a superhuman wisdom, but is achieved by means which are, according to their logical merits, the lowest we know of (compare the illustrative examples above, Section 197).

226. The argument has impressed more than a few people, but anyone who thinks it over more thoroughly will find in it much to criticize.

1. a) One point is obvious to anyone who has followed our previous considerations: Lange overlooks the other uses to which the germs which do not become living beings are nevertheless put.

It is not true that the flower which brings forth no fruit is entirely unused. When a caterpillar destroys a bud it preserves a higher, animal life. When a botanist analyzes a flower it furthers human knowledge. And even when it rots, having been blown down by the wind, it is not destroyed to no purpose; out of its decomposition there proceeds--not directly, but perhaps indirectly--something more perfect than what the fruit of its development would have been. Or, if it perhaps becomes less perfect itself, still the diminished perfection of this single member of the world's order can serve the greater perfection of the whole. "Where would the eye be if all organs were eyes?" (Paulus).

227. What Lange calls waste, then, is not waste in the sense of a useless squandering. Rather it is a necessary consequence of the variety of possible applications which we find here as elsewhere in nature. This itself is teleological, as we said earlier, and therefore the so-called surplus is teleological, too. If there weren't such a surplus then one couldn't snap off a flower without the world order being irreparably destroyed. Every plant would be in the strict sense of the word a "touch-me-not." But that would be a state of affairs that surely no one could call more perfect in comparison with the one that obtains.

228. b) What is more, in each apparently wanton squandering of thousands of works of art there is something marvelous, since it bears witness of the ease with which nature produces what is entirely unattainable for human art. A great artist, creating at the height of his genius, who produces a masterpiece with ease might well use a crumbling limestone wall for a drawing which comes to him in a moment of inspiration. Someone else who achieves something passable only by bitter toil is, on the other hand, anxiously concerned about the preservation of each fairly successful work.

229. c) And we can say still more by way of justifying the waste that is blamed. Not only is it not an absolute waste, it is not a waste as far as reproduction itself is concerned. Even the purpose of preserving the species is served by that apparent surplus. Such preservation is predicated on the principle that like produces like. Thus it is clear that when there is a greater deployment of power in the producing organism then there is a greater abundance of strength in the organism produced. The rabbit of which Lange speaks in his comparison is not killed better on account of the bullets that miss it, but an organism is in a certain sense actually more perfectly produced as a result of the seed which does not produce it.

Only this excess in particular cases makes possible the enrichment and preservation of the species as a whole, throughout the long series of generations and the various changes in individual circumstances, which present ever new difficulties and dangers. And so what seems excessive at the moment is indispensable in the course of centuries. The achievement of such preservation in the face of so many changing hindrances is a success the greatness of which Lange did not properly appreciate. Otherwise he would have seen that the actual success shows not only a certain purposefulness of design but also a very great purposefulness, and in particular a purposefulness and indispensability of what Lange condemns as an excess.

230. To be sure, he could say he does see that in a design according to which like produces like excesses would be required in particular cases. But precisely what he finds unteleological is that like proceeds from like in this way. Rather the organism should in every single case be closely and precisely adapted to its circumstances. For example, if there is a bush by the wayside such that a nanny-goat comes across it when it is in bloom and is driven by hunger to munch on its branches, then this particular bush should be so designed that only those buds and flowers develop which are so situated as to be turned away from the path or to be a certain height from the ground.

But such a view is wide open to attack. For who cannot see, just to mention one of the many things that can be raised against it,* that this would require a much greater artfulness in the design than does the situation which obtains now? And here one might well ask: What for? The many preparations to be made in the anxious avoidance of excess would in fact be the most unjustified excess of all. So it appears that what seems useless development, at first glance, is in truth simplicity and the apparent extravagance a savings.

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* Often the seeds which are destroyed protect the others, like a soldier who dies to save others; e.g., the fruit which satisfies hunger lets the others be spared, as does the *one* rose which is used to adorn a dress or analyzed for botanical purposes.

231. 2. But there is more--even if it really were a waste, the teleology which seems to reveal itself in the reproduction of organisms would still not be diminished but rather remain far greater than the designs of human intelligence.

In order to show this we need only define a bit more sharply the question on which the whole issue turns. This is what the opponents of teleology do not tend to do, and even Lange has not done it despite all the display of eloquence.

What, then, is precisely the point at issue here?

Is it a question of whether the works of nature--the organized bodies, such as the plants, which preserve their species by reproduction--have more reason than human beings do and execute their artful constructions more cleverly than we do? Or is it a question of whether that first foreman (if there is one, as the apparently artful machinery of organisms indicates) must have had a more than human intelligence and superhuman insight?

Obviously we are concerned with the second question. For concerning the first it is clear that neither a human, nor a subhuman, nor any intelligence at all can be attributed to an organism on account of its vegetative functions and all the organs which assist them. No theistic philosopher is so foolish as to maintain anything like that, and if Lange meant to attack such a view then he would just be fighting a battle against windmills.

232. So what is at issue is the apparent intelligence of that possible *first* cause, and not that of any *secondary* cause. And there is no doubt that the first cause can only be thought of as being far beyond the human, even assuming that much working power is unused and lost in the activities which organisms perform. This is apparent when one considers, *in itself*, an animal or plant organism, or even just the flower of a plant, which works primarily as an organ of procreation. All the artfulness of human works vanishes, as we said earlier, beside the artistic unity of a flower's structure, which reveals itself to be even more wonderful under the microscope. Human art, when it intends to imitate a flower, can only render the crudest, most imperfect copy of the general outline.

233. But the amazing teleology of a flower is revealed even more in its *achievements*. Working together with certain conditions in the natural environment it is able to produce a work which is no less artful and perfect than the organism of which it is itself a part.

We are not even directly capable of creating a work of anything near to a similar artfulness; much less are we able to do it indirectly by fabricating a machine which, if left to itself, would be capable independently of yielding a product of such wonderfully perfected, artful structure as a flowering plant.

If a mechanic did fabricate such a machine, and even if ever so much working power was wasted in its productions, and even if it produced ever so much waste besides, still he would rightly be celebrated as the most ingenious fellow, not just of the century, but of the millenium. It wouldn't occur to anyone to find fault with his work on account of the loss of working power and material. Our ordinary manufactured products do include a fair amount of waste, and it is well known that a significant fraction of working power is wasted in any machine.

And now one additional point:

Our mechanics have never yet built a machine which has even once independently produced a machine similar to itself, much less have they produced a machine which has thus become the first member of a self-reproducing series. They would undoubtedly have been happy to do so. In every organism of the natural environment, on the other hand, the solution to this problem is actually realized. Here we really have a machine (if the plants can be considered for the moment to fall in this class) which produces similar beings from generation to generation, and which does so without human beings ever having to provide it with material for this or to protect it from destruction. To be sure, the machine does not find its material everywhere and must often expend some effort to get it. And in the many and various dangers which threaten sometimes the unfinished product and sometimes the machine itself, it often happens that the product or the machine itself is destroyed before its time. But the ease and abundance with which it produces overcomes even all these hindrances, so that the preservation of the species succeeds through the centuries. That is in fact an extraordinary success which includes the triumph over the greatest difficulties. The means, of course, is the one condemned as not very purposeful, the means of waste (since we will assume for the moment that it is such). But the actual success is obviously the best proof of the great purposefulness of the means. And if we were capable (which, as we noted, is unfortunately not the case) of constructing a machine that could sustain and propagate itself without our doing anything further to help, and despite all the possibly unfavorable conditions, then I do not know what means we should choose other than the very arrogantly criticized means of waste. By this means that reason to which organisms seem to point as their forewoman [*Werkmeisterin*] has succeeded with a single direct construction in creating thousands and thousands indirectly, and the impact of her works has permeated one millenium after another from beginning to end.

234. Thus we see that the argument of our opponents no longer retains the least plausibility as soon as it has been made clear that it is a question

of the intelligence, not of secondary causes, but of the first cause, and what is at issue is not the intelligence of organisms but that of the master builder of the first organisms. With such a simple distinction of such obviously different things the whole proud argument based on the waste of seeds is annihilated. Only the lack of clarity in its formulation lent it a seeming significance.

If the question concerned the intelligence of the immediate cause one cannot but have a low opinion of it when, for example, a rose-tree,which a gardner tends only in order to pick its flowers occasionally, continues, despite all the bitter experience it has had, to struggle in the same way unsuccessfully to reproduce itself, when it continues to develop the stamens and pistils together with the full wreath of lovely and fragrant petals which, far from protecting those organs, is in this case the cause of their death. Like its power, its intelligence, if it were operating with intelligence here, obviously must be very limited. But things are different if, as is really the case, it is a question of the intelligence and power of the first cause of the rose-tree, for this will have a view less to the advantage in an individual case than to that of the whole. The action of this first cause does not seem unintelligent on account of the waste, but rather it appears the more intelligent the less intelligent the immediate cause is, since in providing it with an excess of fruitfulness a substitute is offered for the intelligence which the tree itself lacks. (If a father wants to enable a mentally limited son to get through life, he would not do well to give him only just as much as would suffice in the most favorable circumstances. Rather, he will have to provide much more richly for him than for one who is clever enough to make his own way in the world.) Thus it is apparent that the further removed the work is from being intelligent the more apparent waste there will be in nature. Hence the incomparably greater number of flowers on trees and plants compared with the sexual organs of animals. If animals are subjected to even more difficult conditions than most plants are,since the sexes are separated in them, still their sense perception and animal desire offer a substitute for excessive seed production in the way of something analogous to intelligence. Therefore, such an excessive abundance as there is in plants becomes unnecessary here. And the explanation in terms of such a prudent consideration becomes all the more obvious as it becomes apparent that the waste is most pronounced in those kinds of plants which have separate sexes and are thus exposed to increased dangers (e.g., poplars).

235. I believe, therefore, that from our side at least all reproach of nature would have to be silenced, even if the apparent waste of vital germs really were a waste.

236. Before we leave the argument, however, we want to take another separate *look at the comparisons* which Lange makes use of in order to

show the superiority of human teleology over that which seems to be revealed in nature. By means of these comparisons he bestowed a certain special fascination on his argument. We mean to inquire whether they are really appropriate, or whether they are mistaken and perhaps even suffer from a variety of mistakes.

One big mistake we can easily recognize after the inquiry we have completed. It is that in the comparisons, too, the point in question is displaced. They are all chosen as though it were a question of the prudence of organisms in the sense of a rational aptitude internal to them, and not rather in the sense of a construction which can be a credit to an artful intelligence.

The man who fires off a million rifles in all directions in order to shoot a rabbit would certainly seem to have very little intelligence. But what follows from that? At the most that a tree which shoots forth, so to speak, with its flowers, not powder and lead, of course, but pollen and seeds, has very little intelligence. But does the same hold for the intelligence to which the theist attributes the construction of plants and flowers as being their first cause? Certainly not! However irrationally it is fired, even the rifle remains itself a product of reason, to say nothing of the art which the mechanical construction of the stupid hunter himself would require.

Thus we see that Lange proves, or tries to prove, what doesn't need any proof at all, and what does stand in need of a proof he subtly leaves unproved. And the other examples show the same thing. For in the one who buys a thousand keys and tries them all there is the intelligence of the uselessly extravagant customer, and in the one who builds himself a city in order to have a home there is the intelligence of the foolishly extravagant building contractor, both of which are far beneath the standard of ordinary human intelligence. But what else can be concluded here, except perhaps that the intelligence of extravagantly fruitful organisms is not to be put on a level with that of human being--which every teleologist had conceded even *before* this argument, and on much more conclusive grounds than those Lange offers in his comparisons. For these are inappropriate, not just because of the two mistakes we've demonstrated (overlooking the many different uses of a thing, and confusing the intelligence of the work with that of its producer), but also for other reasons.

237. It is not only in Lange, but also commonly in science that what mostly serves to give plausibility to an invalid argument is couching it in one-sided or only apparently suitable comparisons. And so it will not be unprofitable if I expose another couple of mistakes in Lange's similies. Then in similar cases you will know how such arguments are refuted.

A twofold mistake concerns what makes the procedure appear so especially irrational when, as Lange says, a man crisscrosses a whole field with a million rifles in order to shoot one rabbit, or builds a city in order to have one home.

First of all, there is the incongruity between the expenditure and the size of the desired gain. It would be different if, instead of a rabbit, one were trying to hit a rapacious animal or a dreaded highwayman, with whose death the whole land would be restored to peace and security, that is, if this could be achieved with certainty (for this, too, is of some significance). If a whole regiment were standing there and fog or a cloud of smoke covered the ground, why shouldn't the command be given all down the line to "fire," in such a case, in order to be absolutely sure?

In addition there is a second reason why a procedure, such as that which is discussed in the comparisons, appears so especially irrational to us: The much greater ease with which the same result could be achieved even without such means.

Thus in the case of the rabbit (if a only a fairly good hunter takes aim at it; and in any event, it is completely pointless for a hunter to direct his efforts at things in back of him).

Even more so in the case of the extravagant housebuilding, since the one who wants a home can just as well consider in advance where and how he wants to live as he can afterwards.

Finally, the buyer of keys could try before he buys instead of after.

Now on these two points the comparisons obviously do not coincide with the objects of comparison. The one seed which produces an ear of corn because it fell on good ground compensates for many seeds which perish without achieving this. And in general, the construction of a work of art, like that of an organism, and the immortal continuity from generation to generation, is something quite different from the killing of a rabbit.

238. If one takes away all the inappropriate elements, or even just a part of them, then nothing laughable remains, and it is apparent that our opponent (whatever else he may have done I don't know) has in any case not affected the views of the teleologist with his wisecracks. And a greater number of more appropriate comparisons prove that a human being quite often proceeds in a way similar to that of the foreman of nature, indeed proceeds like one of his works, if he really does allow an excess, without anyone finding something irrational about it.

I ask: Who, for example, would call it irrational when a lighthouse shines forth the whole night in all directions, while only a few beams meet with one ship trying to enter the harbor, because this is a useless squandering of all the other beams of light? And if someone digs a well in a garden which flows day and night, while he only fetches a drink of water occasionally at various hours, who will call him a foolish squanderer? And if a thief makes himself ten thousand keys in order to steal a treasure worth millions, if a man studies years for an exam which lasts an hour, will one therefore be free to regard him as feeble-minded? One does prepare oneself for all eventualities. Or if Columbus on the way home from discovering America were overtaken by a storm and, fearing the loss of his discovery, threw a lot of barrells into the sea in order to bring news of it to the world, who would call this irrational? How many messengers and balloons were sent out from Metz and Paris? Who would want to criticize the police for publishing a "wanted" notice on an escaped criminal in many newspapers and in all the copies of each one? Who actually finds it irrational in a serious matter, when there is danger or threatens to be, to avoid putting all one's eggs in one basket? And how is that different from what nature does? And that is what Lange, foolishly enough, calls waste. I really believe that measured by the standard Lange's comparisons use all human beings would immediately appear to be crazy. And in the teleology of nature, in which this means is used for the achievement of the most sublime ends, we may not even speak of irrationality. Here the lack of rationality is decidedly on the part of the critic.

239. Hume, like Lange an opponent of every theistic investigation, takes pains in his own way, in the *Dialogues Concerning Natural Religion,* to find irrationality everywhere in nature. In so doing he comes to a conclusion which nearly coincides with Lange's; but when he brings a reproach against nature it is the opposite one, that she appears to be so tight everywhere, and so extremely parsimonious. That isn't very nice, though, and does not make a divine impression:

> Nature seems to have made the most precise calculation of the needs of her creatures, and like a strict mistress she has not provided them with any more powers and endowments than just what was necessary to satisfy these needs. A kind mother would have granted them a greater store in order to protect them against all contingencies. (*Op. cit.*, Part II)*

Evidently it is just as hard for nature to please everyone as it was for the father and his son in the well-known fable who, out of regard for the people they meet, take turns riding their donkey singly and together, only to be resigned in the end to trotting along beside it. The first argument directed against the appearance of a super-humanly intelligent purposeful order, which rested on the waste of vital germs, seems now to be sufficiently refuted; and so we turn to the second argument.

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* I do not find such a quote in Part II. But in Part XI: ". . . nature seems to have formed an exact calculation of the necessities of her creatures, and like a rigid master, has afforded them little more powers and endowments than what are strictly sufficient to supply those necessities. An indulgent parent would have bestowed a large stock in order to guard against accidents . . . " (Tr.)

240. II. Let us see first whether we can likewise succeed in rejecting the attack which chose as its point of attack the *imperfection of the eye.*

Our opponents are right to say that almost nowhere else does the teleology in nature tend to be marveled at as it is here. And precisely for this reason the argument threatens to become all the more damaging. For if it were to succeed here in destroying, I won't say the appearance of teleology in general, but that of a super-humanly intelligent teleology, then no other phenomenon would be able to arouse it again.

The demonstration of a variety of imperfections really seemed to succeed. The capacity of the eye to accommodate for different distances proved to be limited. It is not achromatic as our good binoculars are. Also, the differences in the clarity of vision at different points on the retina seems clearly to prove the imperfection of the eye. And so Vogt, at least, found the whole apparatus so flawed that he declared, if an optician were to dare to bring him such an instrument he would throw it down at his feet.

If this is how matters stand for the eye, what can be said of the other parts of the body?

241. Our *reply* is: Certainly nothing better! And therefore Vogt would do well, not only to tear out his eyes and have a better pair made by an optician, but also to have his fingers and toes chopped off one by one, or better yet, his arms and legs. For in fact, if an engineer were to build us a locomotive which didn't take us more quickly from place to place than our legs do, or a lever which had no advantage in lifting loads over the joint in our arm, then he'd have a hard time finding buyers for it.

Surely Mr. Vogt will also have had his teeth extracted long ago. For in fact, if a blacksmith delivered me a pair of pliers that didn't grip more tightly, or a knife that didn't cut more sharply, I must confess, even I, though perhaps less hot-tempered than Mr. Vogt, would perhaps be tempted to throw them down at his feet as useless.

242. But there is one thing I still have to add: Despite all this I am no true fan of cutting off limbs and tearing out eyes. And even Mr. Vogt seems to me to have some dread of such consequences himself. And for what reason?--Obviously because there is much which distinguishes the optical glass from the eye, the lever from the elbow, and the knife from the tooth such that the advantage is not likewise on the side of the man-made product. A knife in the mouth might soon have its unpleasant effects, and also, it would not resist rust for long. But how it is supposed to grow gradually in the mouth I am unable even to imagine.

Something similar holds for the eye, too, and is so obvious in all parts of the body that it hardly requires a special comment.

243. This suffices to show by what an insufficient standard Mr. Vogt has judged when he determined the comparative value of the teleology in nature and the teleology in human works. And it suffices to repudiate what is in fact an outrageous blasphemy. If the eye is such an inferior work of art, let him make one! There is no danger that he would succeed, and so there is also no danger that he would refute our demonstration of the superiority of the teleology in organisms.

244. But hasn't it at least been shown that there is much imperfection in the eye, and doesn't that suffice for the recognition that the appearance of teleology in nature can in no way be used to demonstrate that there is a divine intelligence?

The first point is correct, but the second is not something which follows with necessity from it.

a) Nothing which comes to be is perfect in the sense of infinite perfection, nor can it be, as we said earlier. Even the work of an infinite wisdom cannot be infinitely perfect in any of the stages it really achieves, but can only continue perhaps to develop beyond every finite perfection.

b) But even in this sense it is only the whole that can participate in infinite perfection, whereas the part can do so only in its relation to the whole. The whole is the greater good, and the lesser is ordered in relation to the greater as means to end. I can call attention once again to the analogy with a work of art, since here, too, the part must be the most perfect as a part, but the part need not be the most perfect as a whole. And so the part is to be judged as a part of the whole.

Now for everything which is in the world this whole is, in the strictest sense of the word, just the whole world, which is unknown to us, and therefore the one most suitable standard of judgment is not available to us.

Yet, for the perfection of a regularly constructed member, the whole living being to which it belongs may even be called in a certain respect a more dependable standard. If we apply it we will see that no rational ground for condemnation is given to us.

245. Of course, the eye could be so constructed as to see more perfectly and to adjust itself for lesser and greater distances than it presently does. (Although according to Helmholtz no standard for measuring distance has yet been found*.) But the degree of perfection of their vision suffices for

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* That is, because it is impossible to tell which geometry (e.g., Euclidean or non-Euclidean) actually characterizes real space. (Tr.)

the needs of living beings, even though the best eyes are unable to accommodate for the distance of the fixed stars. The accommodation does vary, and precisely in this variety, as Cuvier says, allowance is made for a variety of needs. (Certainly human beings have a greater interest than any animal in seeing more clearly close up and far away, for the purpose of scientific investigation, but something similar may be said here as may be said of the hand. This, too, is not as strong as the powerful limbs of animals, but it is strong enough to make the most powerful weapons. And thus our eye is sharp enough for the construction of microscopes and telescopes.)

246. Someone might say, that is certainly true, but how shall we justify the fact that the same eye of the same animal sees differently at different points--here more clearly, there less so, and with perfect clarity only at the relatively small yellow spot? But this, too, is no insoluble objection. Above all, there is no harm in it for us, since the narrow scope of consciousness only allows for full attention to be given to a small part of the picture at a given moment. And the wonderfully perfect mobility of the eye lets us direct the point of clearest vision toward the different parts of the larger visual field one after the other with the greatest rapidity. So there is nothing the least bit inappropriate here.

But there is more. It is precisely here that physiology has already discovered a specially calculated design. That is, it is essentially the fact of these various degrees of clarity in vision that we have to thank for the avoidance of double images when we see.

247. However, someone says, chromaticity is still a flaw in any case, and cannot be justified, especially because we see in white light.

Do you think so?--I think it is actually very easy to justify. And the ground of justification, against which it is not easy to raise a further valid objection, is the almost total imperceptibility of the color dispersion. It is quite certain that none of you, who has not already studied physiology, will have known anything at all about it. The physiologists themselves first inferred from the structure of the eye that white objects must be perceived with a colored outline. And at first they were at a loss as to how they should reconcile this with the fact that usually the colored area of white objects goes unnoticed even by the most attentive observers. You can learn how they finally succeeded in this from any of the more thorough textbooks on physiology.

248. So if the eye is not achromatic, still it is as good as achromatic for the function it has to perform. And if this is true, then the lack of special equipment, such as we attach to our optical instruments to effect a perfect achromaticity, is grounds not for condemnation but for praise. For any useless complication is unteleological, and this holds all the more for

organisms, where everything is interrelated with everything else, and one complication would have to result in a thousand other complications. If nature has permitted the eye to be chromatically flawed in the way set forth in our discussion, then she proceeds no differently than, for instance, our mathematicians proceed. When, in a long and difficult calculation, they come upon a very small fraction, they simply disregard it if taking it into consideration would make every operation extraordinarily difficult without the greater precision of the end result yielding a compensation in proportion to the trouble it took. This is a procedure so widely accepted as a method that the expression, "insignificant fraction,"* has passed over into ordinary life.

So once again we see the appearance of teleology completely victorious over its challengers.

And like the eye, every part of the body will find its defense in the consideration of its true teleological standard, which often can provide an explanation of it, or else can make the lack of an explanation conceivable in view of the narrow scope of our knowledge.

249. III. We turn now to ward off the *third* objection against the sublimity of the apparent teleology in nature. Unlike the two previous ones, it is not founded on facts which are accessible only to scientific investigation, but rather it points out facts such as no one, even with the most superficial knowledge of the phenomena, could deny.

It is said that nothing should be able to thwart the purposes of a divine intelligence. But plainly some things do:

This is apparent as often as even just one flower or egg is destroyed, it is apparent in illness and deformity, in untimely and violent death, in moral depravity, indeed in every moral mistake, such as even the life of the most just person presents every day. In a word, every disorder, in great things or in small, proves how the designs of that intelligence which one is perhaps inclined to assume in nature are frequently brought to nothing. The so-called divine intelligence, it is said, must have miscalculated ever so often.

250. We are not unprepared in approaching the reply to this objection. On the contrary, we have essentially only to refer back to earlier considerations. Nevertheless, we do not want to leave anything essential unmentioned if it serves the refutation, even at the risk of repeating ourselves. First we will say something general, and then, since a series of separate phenomena were touched upon, we will also say something particular about them individually.

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* The German expression is, "etwas in die Brüche fallen lassen," which can mean "to round off [a number]" *or* "to disregard something." The German word for "fraction," *der Bruch*, is akin to the English "breach." (Tr.)

251. Above all I must recall the *distinction between purpose and function.* We stated it carefully earlier, and at the same time showed how purpose and function can diverge; how in nature purposes are almost always hidden from us, but functions are quite easily recognizable; how the functions can be many and mutually opposed, but the purpose is one; and how the purpose is always achieved, if nature is supposed to have an infinitely perfect creator, but functions often do not succeed in being fulfilled.

With the help of this concept we have already shed light on many of the particular phenomena we considered, e.g., the phenomenon of the flowers and the unripe fruit, large quantities of which perish. And we have also seen how they never seem to be actual rubbish on that account in the household of nature, but always find one of the variety of possible applications.

252. Then I must recall what we have already emphasized: That the *whole is the standard of the part.* The whole world would be the true standard for judging any really occurring inappropriateness. Knowledge of the standard is not available to us, and therefore we do lack the means of explaining things perfectly specifically, but our opponent also lacks the weapon for a decisive attack.

Nevertheless, I emphasize that the perfection of the total design requires universality of law; the world order ought to be, not a concoction patched together with miracles and direct repair jobs, but a unified plan implemented on a grand scale. Upon this consideration, many things are permitted in a part which would not make it appear perfect as a whole, but which do make it appear perfect as a part of the world,in its place and for the implementation of the universal laws.

253. Finally, I recall once again that the world, if it is the work of an infinitely perfect intelligence, must participate in some way in its infinite perfection. But this only in the way in which a work is able to do so, namely, *by the development beyond every finite degree of perfection.* Each earlier stage is imperfect by comparison with the later ones, as in embryonic development. And at what phase should the development begin? It is plausible to think that, compared with the later stages, it must appear to be a kind of chaos. And that, so to speak, chaotic and, taken in itself, disorderly and imperfect work will also persist in the subsequent stages and, if the development is to be infinite, it will never disappear entirely, but perfection will struggle victoriously with this imperfection forever, always remaining, so to speak,infinitely far away from the end and relatively close to the beginning. And who would be able to specify precisely the exact duration of the successive periods? Mustn't a great deal of disorder be expected quite naturally, even if the traces of

nascent order which appear intermittently far surpass everything which we are able to arrange?

254. IV. In light of this, let us explain in particular some of the phenomena which most offended our opponents, and in that connection account at the same time for the moral inferiority (of the creative intelligence) which is inferred from them.

It was said that the rational being which is perhaps to be thought of as a cause, would have to be far below the moral standard at which the better human beings are to be found. A good human being would prefer to limit the generation of new life, rather than doom the excess of generated life to destruction. He would eliminate suffering, error, and animosity. And as it is, we see an excess of all those things. An abundance of pessimistic sayings by poets and thinkers are thus able to become familiar quotations.

"Man is born to suffer." "As long as man strives, he goes astray."--οι πλειστοι κακοὶ.

Ordinary language has made the words "rare" and "extraordinary" into direct synonyms for "excellent." According to the modern, Darwinian philosophers, "the war of all with all" is the principle of the world's development, and in this discouraging doctrine they have come upon an ancient idea from pre-Socratic times.

255. On closer inspection, the issue raised by this argument is not strictly-speaking an objection to our thesis. Rather, its proper place would be either earlier, under the attacks seeking to show *a priori* that the assumption of a god is impossible, or else later where the intelligence which orders the world is to be shown to be an infinitely perfect being (by which its perfect goodness would be assured, too, as well as the perfection of its intelligence).

Nevertheless, let a brief reply be made to these remarks. But it should be noted again that this reply does not aim at showing that the world order would require a designer infinitely perfect from a moral point of view, rather it aims only at showing that our opponents have not proved that the world order is consistent with a morally bad designing principle.

256. And it is not hard to accomplish this. Of concern here, above all, is the consideration of a factor which is not immaterial, namely, that mankind is limited with regard to the knowledge of what is good and evil in itself, and in its value relation to another good or evil thing. Psychology and ethical epistemology show that in all probability we are incapable of recognizing the goodness of entire classes of goods. Likewise, we have in many cases no means of establishing the quantitative relations among certain goods. In choosing, if we want to further the good, we consider only the few things we can compare as being good or evil. And so it is very natural that we do not entirely comprehend the value judgments

of a being that possesses more comprehensive insights in this area. So for this reason, as for others produced earlier, we must be very cautious with moral reproaches against the possible designer of the world. For he wills morally who chooses the best possible as the ultimate end.

257. After these general remarks, a couple of words relevant to individual instances.

The limiting of generation, and the greatest possible preservation of what is generated, is supposed to be more ethical than the excessive production of new life, the greater part of which perishes before its time. This is not a self-evident proposition, in any event, and so it is certainly not correct unconditionally either, but only in those cases in which the first way would lead to a better world than the second. But then, in discussing the allegedly foolish waste of vital germs we have already found that what is thought to be the excessive abundance of productive power in nature is what preserves and promotes perfection in the organic world in the most expedient way.

258. Again: A moral governing principle of the world, it is thought, would not have incorporated suffering, error, and wickedness in its plan. How can an infinitely kind and powerful being decree or even permit that anyone be hurt, that anyone labor under delusions with regard to the most important things, or that anyone succumb to the greatest moral corruption?

Nothing is more petty and superficial than this kind of talk. Why shouldn't what we said about permitting an evil in the part,out of regard for the perfection of the whole, find some application to suffering, error, and moral corruption? In finitely perfect beings error and knowledge, bad will and good, suffering and joy rest on the same fundamental principles of mental life. Anyone who would eradicate error, bad will, and suffering altogether will have to banish all rational, mental life from the world generally, unless the natural course of events is to be interrupted again and again by miraculous interventions. But he would hardly have made the world more interesting or more perfect thereby.

259. Perhaps someone will say: "Not made more interesting," I concede; but made better in any case. For as it is now, it contains more error than knowledge, more vice than virtue, more suffering than pleasure. That is to say, evil predominates. And so, all in all, a *tabula rasa* in this area should be called progress.

But even if many maintain this emphatically, they still do not present anything which would justify this,their confident judgment. It may be that there are more morally weak, indeed more vicious people than heroically virtuous ones. But what a crude way to determine whether the sum of good or evil predominates--by counting like that! As far as I'm concerned, the existence of a man like Socrates seems to me to be of such value that for his sake I would not wish to miss the history of Athens, even if ten thousand more scoundrels should have worked their mischief there. I almost feel as though I would not wish that one painting by Titian didn't exist, even if ten thousand other aesthetically monstrous painters should vanish with it.

The same holds for error and knowledge. I concede that error is widespread. Indeed everyone, even the wisest man, is at the mercy of foolish illusions while asleep. But the value of *one* discovery that he makes while awake may surely still outweigh all the worthlessness of these dreamy delusions.

260. Finally, as far as pain and pleasure are concerned, it is certainly not proved that the amount of pain outweighs that of pleasure. Many claim it does (e.g., Schopenhauer, Turgenev), many believe just as decidedly that the opposite is true (thus Hutcheson, and again recently, Hamerling).

If one examines the alleged proofs one finds that everything rests on subjective evaluations, which bear little resemblance to a true measurement. It is essentially a matter of temperament. Thus children, though occasionally they let out desperate cries of pain, do not easily become pessimistic with regard to the enjoyments of life, whereas *morosa senectus*, even though occasionally it enjoys itself exquisitely, is generally more amenable to the grim, Schopenhauerian world-outlook.

But whatever may be said of the relative value of joy and sorrow, one thing is sure: While the highest joys are pure goods, the most dreadful agonies also contain some good. For such are the agonies of a criminal conscience, those painful self-reproaches the power of which the ancients attributed to the Furies. There is something noble and holy in this pain. And aside from what may be said of its inherent value, this pain seems, as clearly other less intense pains are, to be generally so designed in terms of its results that it becomes not very difficult to believe that even suffering is called to preserve and promote the perfection of the world as a whole. And this confers upon it a high utilitarian value, as is the case with pleasure, which generally works this way, too.

261. V. But one objection requires a special word of rebuttal in this regard. It was pointed out, not only that there are so many bad things in the world, but also that the apparent calling of natural things is the pursuit of evil. Not only is opposition, rather than harmony, continually evident everywhere, but this opposition, the war of all with all, seems to be the mission of things. Things seem to be told to struggle with and destroy one another. It's not "everything for everything else," as we had said, but "everything against everything else." War, not peace, is the father of life, naturally of the most miserable life. And thus the world

would appear to be the worst of all possible worlds. Everything is permeated to the core by an evil spirit, so that we always see what is bad, either failures, or else successes by evil means.

If the appearance of the rule of a divine principle is to be acknowledged here, then it is the rule, not of a kind principle, but of a Manichean principle of evil.

262. Here it becomes quite clear what can be achieved by incomplete and inexact representation, and by rhetorical devices. If these are removed, not much remains of the whole pompous argumentation, at least nothing which wouldn't already be refuted by the present discussion.

263. Let us show this in detail. First of all, not everything which is called a struggle here is really a struggle. Struggle can be spoken of, in the correct and strict sense of it, only when desire is involved. Thus in all lifeless things, and in all that is carried out in unconscious biological functioning, struggle can be spoken of only in the very loosest sense. That is, it can be spoken of in this sense insofar as all action and reaction, particularly that which leads in certain cases to one-sided or mutual destruction of substances, exhibits a certain similarity to struggles properly so called.

264. Furthermore, not everything which is a struggle is really bad for both sides or even for one side.

If we take "bad" in the moral sense this is obvious, both for struggle in the strict sense and for struggle in the loose sense of which we just spoke. That the latter can never be called morally bad is evident. But the same holds for struggle in the strict sense, too, as far as it is carried out non-rationally, as by animals.

Only man, of all the animals in our experience, has the gift of reason and with it the capacity for moral and immoral behavior. But even the struggles he undertakes upon rational consideration, those in which he struggles against other living beings or even against unconscious nature, as well as those in which he struggles against other human beings, are by no means all to be called morally evil. The question is rather what ends he strives for and what means he uses to attain them. He can make a mistake in either respect, but a struggle thus mistakenly carried out will never be his proper task. The true task set for one who proceeds rationally is that of loving what is perfect, of aspiring toward it with all his strength and subjecting himself and other things to it, and whatever else is to be derived as a consequence from this principle. No struggle is his proper task except as a consequence in no way conflicting with this principle. Any other is a deviation from his proper task.

With this it is proved in general that struggle, as far as it appears to be the function of things in the world, is never morally bad. And therefore, even if there is a call to struggle, in the strict or in the less strict sense, still there is never on that account a calling characteristic of a thing to pursue what is morally bad.

265. But even if the object pursued is not something morally bad, isn't any struggle actually to be called something bad, and doesn't it make the possible creator of the world, who would have consciously and freely called everything to struggle, appear morally bad nevertheless?

Not at all! Of course, it is true that wherever a struggle is carried on (even one such that both parties appear to be called to struggle) a lack of perfection is found. Both parties cannot win. At least one fails to achieve what he strives for, and fails to strive for what is compatible with the plan of the whole and with his own destiny. But we did see earlier how such imperfections in the parts are consistent with the perfection of the whole, indeed they can be permitted for its sake. And in particular we saw how it can happen that the individual parts of the world, though unacquainted with its real ends, nevertheless contribute to their realization in all their actions.

266. But isn't struggle often directed at destruction, and doesn't it lead, when it is successful, to real destruction? That, however, is the very reason why it must appear to be evil.

We reply: If that struggle resulted only in destruction, or even if the strugglers themselves were only striving to destroy, then of course the one who gave them that vocation could hardly appear to be morally good anymore. But in both respects the opposite is obviously the case. Never is desire directed at destruction for its own sake, but it can be directed at a good which is not to be achieved without destruction. So it is when a beast of prey manages to live by the death of another animal, or when an herbivore consumes leaves and fruit. And insofar as there seems to be an analog of desire in the realm of unconscious things--whether that plants take into themselves material from the ground and the atmosphere and break it down, or that physical or chemical processes occur in inorganic nature--the same holds for this.

267. And nowhere is the result of a struggle mere destruction.

On the contrary, every destruction is a construction at the same time. *Corruptio unius est generatio alterius*. And what is constructed in and by the destruction is often more perfect considered in itself than was the thing destroyed. In any event, even when this is not the case, as we saw earlier there is nothing against the assumption that it is more perfect when considered in the context of the whole.

268. And the process of struggle itself, of struggle in the strict sense as well as in the loose sense, is one of the most refined perfections of the whole.

The reciprocal acting and being acted upon of all things is what first made the world a world and enabled development as it lent unity. And this becomes the more marvelous the more deeply the transforming power reaches into the innermost being of things. In destruction, substance displays its capacity to be a material cause.

In conscious struggle, however, struggle in the strict sense, living power is stimulated to increased activity. And activity, in general but especially in living things, is the most excellent perfection.

Thus it is in the struggles of animals. The fox is not truly a fox, and the lion not in the completed sense a lion, except in the cunning entrapment or in the bold attack of what they have fixed upon as their prey. Human beings, too, are awakened by the struggle for self-preservation, and it is no accident that the peoples of regions where nature offers her gifts most generously tend least to develop their powers of enterprising activity.

269. I could say much more about what good is achieved by this so-called struggle. Darwin and even Heraclitus regard it as the vehicle of progress.

We see, then, how unjustified the reproach of our opponents was when they interpreted the call to struggle as a bad design on the part of the world's governing principle. Even the individual often gains in perfection by means of struggle, or, if it is injured or destroyed, still the whole gains in perfection thereby.

270. To be sure, we may view with a certain sadness the ruin of something beautiful and noble, but anyone who has once understood the teleology of the world views this spectacle at the same time with an amazed admiration. In the destruction of a perfect thing there is something sublime. The grandeur of God, indeed even that of the whole world, is evident in the frailty of its individual parts. The individual, however perfect it seemed to be, was not so perfect that it deserved a place in the world forever. It was the effect, not of exhausting effort, but, so to speak, of play; and in being exposed to destruction it bears witness most of all to the effortless facility of its construction. In this vein Heraclitus says, "Zeus makes the world playing like a boy, and then unmakes it with fire, such games does Zeus play."

And the same thought, of the sublimity of God in the destruction of creatures, had moved the poet when he said:

Past all hope
Man gives way to the gods' power,
Vainly watches his works' flower
Being awesomely destroyed.*

Now if the world is the most perfect when it most reveals the perfection of God, then it is easily seen that in this respect, too, as in so many others, struggle and destruction in the world appear to be well designed teleologically.

271. We had said, in the world everything seems to be for everything else. In the objection it was maintained, on the contrary, that this is so completely mistaken, that everything seems rather to be against everything else. We had spoken of harmony; in the objection it was maintained, on the contrary, that this is so totally false, that rather opposition is apparent everywhere.

The objection overlooks the fact that what is against another thing can still on that account be for it, and things in opposition can still on that account find themselves in harmony. What is against the perfection of another thing, considered in itself, can still at the same time favor the perfection which is its share as a part of the whole. And likewise opposition among the parts can exist together with harmony in the whole, as can opposition among functions with unity of design and purpose. So it can happen, too, that while war permeates all realms of the world in one sense, in another and higher sense everything is ordered in the most perfect peace.

And so the examination of this objection, like that of the others, yields the result that nothing is able to destroy the appearance of teleology which we have shown to be in the world, indeed nothing is able to justify us at all in condemning this teleology.

*Hoffnungslos
Weicht der Mensch der Götter Stärke,
Müssig sieht er seine Werke
Und bewundernd untergehn.

SECOND PART: THE REALITY OF TELEOLOGY

I. THE HYPOTHESIS OF BLIND NECESSITY

A. OLDER AND RECENT FORMS OF THIS HYPOTHESIS

272. The question is: Does this apparent purposeful order in the world signify a real purposeful order, i.e., is it to be understood as the result of the activity of an intelligence and will?

In what way, then, is this inquiry to be carried out?

The appearance of purposeful order is a fact. We must ask what the hypotheses are by which this fact is explainable. If several such hypotheses are possible, then we have to establish the probability of each. If the probability of one of them infinitely surpasses the sum of the probabilities of all the rest, then its probability is infinite, i.e., it is (physically) certain.

273. In fact, three hypotheses have been advanced:

The first implies none other than the reality of the purposeful order. It proposes to explain the appearance of purposeful order by the fact that an intelligence and will was at work and set up this purposeful order.

The second hypothesis is the hypothesis of chance. This order in nature is accepted as an ultimate fact. It is just a matter of apparently teleological collocations.

The third hypothesis is the hypothesis of blind necessity. It follows from the laws of nature that nature--left to itself, without the help of any designing principle, and whatever the collocation of its constituents may be--must gradually pass into a state which bears the appearance of the most deliberately purposeful order.

It is easy to demonstrate that no fourth hypothesis is possible for the apparent purposeful order is either real purposeful order or mere appearance. In the first case, the first hypothesis holds good. If it is mere appearance, then it arises either of necessity or not of necessity.

274. But if it is beyond a doubt that no fourth hypothesis is possible, then that suggests another question: Are all three of the hypotheses mentioned really to be admitted as possible?

Here the third, in particular, gives occasion for second thoughts.

275. In order to illustrate it, use has been made of the comparison with a kaleidoscope, which gives an appearance of order to every random grouping. Naturally, such a comparison proves nothing. It does not even

seem to be very appropriate. The three mirrors placed together at definite angles are compared to the laws which govern nature, whereas on the contrary they appear to be constituents of the originally orderly collocation. A parallel could only be drawn between, say, the principles of reflection and the laws governing nature. But when that is done, the whole analogy fails. Also, the randomly tossed colored chips do not appear to be artfully and regularly ordered if they are considered in their relation to one another, but only when they are taken as a whole together with the mirrors in which, thanks to the order previously given, they recur in regular succession.

276. So let us leave these analogies, which, even if they had been chosen more appropriately, would still have little significance.

More important is what has been said ever since Democritus' time (for even the father of atomism, indeed to some extent Empedocles before him, too, had paved the way for this kind of mechanical explanation of the apparent purposefulness in nature). The attempt has been made, namely, to present facts which are supposed to show how an entirely random disorder in nature gradually becomes a regular order through blind necessity.

Democritus pointed out how a clearer and more beautiful order must still come to be gradually even out of the most disorderly chaos, since things of the same kind come together with each other (swallows with swallows, cranes with cranes. When grain is threshed it separates from the chaff. In the sea, shellfish of a similar form are produced in the same place).

277. Today greater claims are advanced. The order we perceive in the phenomena of the heavens, the regularity of the motion of the stars, was long attributed to the influence, indeed to the direct influence of spiritual powers. But the law of gravitation has eliminated these spirits as unnecessary, and has showed at the same time how two or more masses--at whatever distance from one another, and with whatever force, they are propelled in different directions (provided only that it is not too great)--will by natural necessity enter into a similarly regular play of periodic revolution.

278. Indeed, the purely mechanical explanation of nature claims to solve still greater problems of apparent teleology. It even believes itself capable of comprehending and explaining the perfection of organization,which we admire in great variety in plants and animals, on the basis of universal laws, as the physically necessary result *of any developmental process, no matter how imperfect the beginnings may be from which it proceeds.*

279. Empedocles had already expressed the thought that, of the variety of dispositions for organic forms, which have come to be over the passage of time under the influence of combining and separating forces, those which were entirely malformed perished, being unfit for life, whereas the more perfect forms maintained and reproduced themselves. And thus the earth was necessarily gradually populated by species of well-formed living beings, as we now observe it to be all around us.

The Darwinian Theory of Natural Selection

280. Our advanced science is amused by the way Empedocles developed the details of his theory. But the thought behind it still has not died out, in fact in our day it has created a great sensation and won numerous supporters. This happened when Darwin appeared with his doctrine of sexual selection.

A breeder improves his stock by maintaining exclusively the more perfect specimens and using them for propagation according to the laws of *heredity* and *mutation*.

According to the first of these laws, each animal and each plant, of whatever species it may be, passes on to its descendants a general similarity having particular characteristics. According to the second law, each individual can deviate a little bit in any arbitrary way or direction from the individuals from which it is descended. Thus breeders create entirely new species (Pigeons: fantail pigeons, tumbler pigeons, etc.--Sheep in England with long, woolly bodies and short legs.--Bulls without horns in Paraguay).

Nature does the same thing. The principle which here takes the place of intentional selection is the struggle for life (or for the necessities of life). Even though it works slowly, over a length of time (and after all, the time is to be regarded as practically infinite), the struggle for life has significant and all the more lasting effects.

Every species of animal and plant, that is, has the tendency to multiply in a geometric progression, as Malthus pointed out before Darwin, in connection with political economy. At the same time, however, the means which nature offers for their preservation either do not increase at all or else fail to do so in this constant way. As a result each individual has to endure a very hard struggle for its existence, while the total animal and vegetable population of the earth (man and his efficacy excepted) remains almost stationary. So every variation, of whatever kind, which serves to save the life of the individual or to make it capable of preserving its species with greater certainty, is preserved in the long run, and the favorable characteristic is bequeathed to some of its descendants. This characteristic is thus reinforced until it reaches the highest degree of usefulness. On the other hand, individuals which exhibit unfavorable characteristics will inexorably perish. Therefore the effect of natural selection can be called, not inappropriately, the "survival of the fittest," to use Herbert Spencer's expression.

The less perfect and less well-adapted to circumstances cannot exist beside the more perfect and better adapted. Thus in society, too, the less skilled craftsman cannot exist next to the more skilled, nor the less gifted artist next to the more gifted, as long as a certain number of the latter are available. And likewise, to take another example from the relations of human beings to one another, it seems in our day that the native Americans have been forced to succumb to the immigrating Europaeans.

281. In this way, then, Darwin believes himself able to explain the development of the most perfect organisms out of the original, relatively imperfect ones, as a physically necessary occurrence. And he also believes he has explained what is included in this, the development of the most complicated structures out of relatively very simple ones. For organisms with different members are higher on account of the division of labor among the different members.

282. And not only is perfection supposed to come from imperfection, but so is the variety of teleological forms supposed to come from their earlier paucity.

The reason being, as was said, that the variations occur in the most diverse directions. And the struggle for existence proves to be the enemy of an overly extensive uniformity as well as of imperfection. This is partly because competition among equals is much harder. If everyone were a shoemaker how would everybody survive? On the other hand, without division of labor no true progress is achieved. If someone were able to make a few shoes, do a little baking, a little wood working, such a Jack-of-all-trades would not be able to hold his own beside the trained specialists.

Also, different organisms are better adapted to different circumstances. In general, it is an advantage for an insect to be able to fly well, but there are circumstances in which this is not the case. On an island battered by many storms, insects with rudimentary wings have the advantage of being not so easily blown out to the open sea. (In New Zealand there is a flightless bird, the apteryx.) Migration or a change in the climatic conditions of an area can thus have transformed what was originally useful into a disadvantage.

283. So Darwin means not only to derive human beings from fish, or from even less perfect bisexual forms, but also to derive all vertebrates from a common ancestor, and he proceeds in a similar way in the other divisions of living things.

No wonder that others have gone even further along the beaten track, and hold that all organisms emerged from the same original cell consisting of protoplasm and a nucleus--which came in turn from a structureless glob of protein--all proceeding, by means of the struggle for life, in a progressive development with a wide variety of ramifications, lasting millions or perhaps trillions of years.

284. In his *General Morphology,* and *Natural History of Creation,* Häckel especially has traced an entire phylogenetic tree in this way. Of course, there are many gaps in it which are to be filled only by hypothetical connecting links, but always according to an analogy with other intervals.

And, true to his method, he ascends from the root to the tree-top. He seeks to give an account thereby of the development of the highest spiritual virtues as well as of the first and lowest evolutions.

Indeed he achieves more here than can fairly be required; for he explains superior advantages which never occur but are only erroneously maintained by philosophers, such as innate ideas.

But instincts, too, have developed in the struggle for life. For example the fear felt by a hare; earlier there were brave hares who ventured too much, and cowardly lions who ventured too little, both of which therefore died out. If an animal liked poisonous plants or even just lacked an abhorrence of them, then it would soon have to meet its demise, and this kind of selection has as its result animals in which the necessary instinctive inclinations have been formed. This is actually how the natural instincts have been arrived at, then, which direct animals in their choice of nourishment.

And Häckel could also explain the higher inclinations in this way--even the pangs of conscience, since those in whom they appear to be undeveloped, or developed to a lesser degree, are gradually dying out on the gallows. The only difficulty would be, as is evident in ancient as well as in recent times, that precisely the greatest thieves are usually let go. But such are few by nature, and so this difficulty, like others, seems to be surmountable.

285. Now if all this has proceeded by physical necessity from a little glob of protein, then it is no longer difficult to assume that in the course of time, under the steady and necessary change of situations and physical conditions, there must have resulted, at least once, the combination of circumstances by which this quaternary carbon compound we call protein was formed out of inorganic matter in the meeting of carbon, oxygen, hydrogen and nitrogen. (Häckel, *Generelle Morphologie* I, p.183.)

Even though until now the formation of protein has only been observed in organic substances, one cannot hold that therefore this is the sole possible mode of its coming to be. For chemists have already produced many other organic substances, such as urine, alcohol, formic acid and other more complicated carbon compounds by purely organic means. (*Op. Cit.*, p.189.)

286. And so the mechanical hypothesis, the hypothesis of blind necessity, believes it has given such a brilliant exhibition of its ability to explain the highest phenomena of apparent teleology that the possibility of blind necessity can no longer be contested. Indeed the claim is that any rational person would award it the victory over its two rivals, the hypothesis of chance and the hypothesis of an intelligence which designed the world.

With the proud feeling of victory, therefore, Ernst Häckel proclaims in his *General Morphology* (I, p.100, note 2), after he has presented the Darwinian principle: "There is no more chance than purpose in nature . . . In our view, what takes the place of purpose (and of free will) is absolute necessity, ανάγκη."

287. So the advocates of blind necessity mean to prove first of all that their hypothesis is *possible*. In fact, if we survey everything, it seems that its possibility is no longer to be contested. It seems rather to have been shown that, in the most diverse realms, phenomena which one admires as being teleological are explainable on the basis of purely mechanical necessity. Thus, in the realm of the inorganic world, the regularity of astronomical phenomena. And likewise in the higher and seemingly excellently teleological realms of vegetative, sensual, and intellectual life, the wonderfully purposeful structure of the most perfect organisms and the phenomena of instinct and of the pangs of conscience.

So it is quite conceivable that everything has formed itself out of blind necessity, however teleological it may appear.

B. CRITIQUE OF THE HYPOTHESIS OF BLIND NECESSITY

288. Nevertheless, this is not the case, and the appearance by which so many have let themselves be deceived vanishes upon closer inspection. Anyone who understands the phenomena, not just superficially but by paying close attention, as we have done, recognizes clearly that the hypothesis of mechanical necessity is impossible. Far from making intelligible the teleology in the phenomena of organic nature, it proves to be unable even to explain those traces of apparent purposefulness which we encounter *in the lower realm of the inorganic world.*

In order to show this, we wish to recall just one thing from earlier considerations, which is especially convincing and incontrovertible in showing the impossibility of that kind of explanation.

289. The teleological proportions of the elements, as well as their similarity and the uniform subordination of all under certain universal laws, and the variety of forces, the mutual fulfillment of the abilities to act and be acted upon--all this cannot be understood, now or ever, on the basis of blind necessity. The mechanical hypothesis here faces *ultimate facts*

which it cannot explain, which are rather the presuppositions and the means of its explanations. Whence the apparent teleology in those ultimate facts?

290. The most wonderful of these relationships are those which make possible the development of an organism out of the elements, whether it be a plant or even a perceiving and desiring animal. Not all of the elements which exist are suited for this. What would be left of the whole wonderful kingdom of organisms if there were no oxygen or nitrogen, or if these were available in more limited quantities? Oxygen seems to constitute over half the weight of our planet. And no one can deny the possibility that there could be more as well as less of it available, or even none at all.

The advocates of absolute necessity have not thought this far. And, forced to answer, nothing is left for them but to decline, with Democritus, and declare the question unjustified: τοû αιὲ όντος ουκ αξιοû αίτιον επιζητεîν* which is obviously an empty evasion as Aristotle had remarked. The hypothesis of necessity fails and the hypothesis of chance, to which it prided itself on being so very superior, has to fill in the gaps.

291. The existence together in space of several elementary parts--quite aside from any particular distribution within the occupied space--is one instance among many which are equally possible. Without it nothing would have any effect since if bodies were entirely separated then they would have no influence on one another. But in that case all those laws which are supposed to beget teleology would remain unfruitful and dead. So the present disposition of things certainly appears to be highly teleological. How is it to be explained, then? It is a given fact. But it is obviously not necessary, and thus forces one to borrow again from the hypothesis of chance.

292. We could follow this further, but these outlines suffice. Let us turn to the realm of life and organisms.

Here, too, just a few remarks, but they will suffice to destroy completely the illusion of an explanation of the apparent teleology of organisms on the basis of blind necessity.

a) First of all, the *presence of organisms* is not at all to be understood as a necessary result of the laws governing the organic world.

Science has established that within the whole realm of experience no spontaneous generation occurs. It had been believed in earlier, based upon experiences such as that a drop taken from a glass of pure water suddenly appears to be filled with an immense number of microscopic creatures. But the physiologist Pasteur succeeded in demonstrating that these infusoria are not formed out of inorganic matter at all, but out of germs taken from the surrounding air. If he passed the air through a gun-barrel made red hot and then exposed the water to this air, no more infusoria were formed. This experiment commanded such respect that Virchow said that all known facts speak against spontaneous generation at the present time. A philosopher who is closest to the natural scientists, Wundt, has likewise expressly acknowledged that it is guaranteed that now, at least, the conditions for spontaneous generation on earth are no longer present.

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* For what has always existed, the question concerning its cause is unjustified.

293. But for this reason it is improbable to the highest degree that this once used to be the case--*if we do not wish to presuppose quite exquisitely purposeful accommodations*. For if an organic thing is supposed to have come to be once from an inorganic thing without such accommodations, then it could do so now, too. The elements are all present, and even the physical forces and conditions are not essentially altered in such a way as not to allow the earlier circumstances to be produced again, at least partially. And therefore there is not a single product which, if it were established that the inorganic world had once produced it by itself, it could not still be demonstrably able to produce today, even if not in an equal quantity.

294. Of course, what I've said is defeated by one exception. There is a strong indication that the matter composing our earth was once in the state of being heated to such a high temperature that the same heat cannot be produced now, even partially. According to the Laplacian hypothesis the Earth's matter, and that of the solar system generally, once expanded to such an extent, as a result of its temperature, that a mass of the weight of a peppercorn, three cubic millimeters of solid tellurium, occupied one hundred billion cubic miles of space. But this is not a situation in which organisms can form, for in this regard, as in others, they require a certain moderation and tempering of forces.

295. If we disregard achievements which are not in any case relevant to our question, then what was said above holds good: Whatever is known to us to have been automatically produced out of inorganic matter previously is still thus producible now. Indeed, at least experimentally, it seems more likely to be produced inorganically now than previously. Thus it is very improbable, for example, that urea, alcohol, or formic acid ever came to be out of inorganic matter without an artful agent.

And so I do not wish to deny that perhaps even protein will be produced artificially someday--from which it does not follow that it ever once previously came to be automatically in nature. Rather, when that happens, too, it will remain highly improbable that such a constellation of conditions as we effect artificially ever occurred spontaneously.

296. But assuming that such a little glob of protein did come to be automatically, still it was just a simple glob of protein at first, *not an organized body* whose structure, however lowly its organization may be, is incomparably more delicate than that of the most perfect statue. Here Darwin saw more clearly than Häckel. In opposition to those who find some degradation in the descent of the human organism from other, lower ones, Darwin holds that any organism however humble is a great and amazing work of art. Of course, one usually does not see its structure. But nothing follows from that, since it escapes our perception due to its smallness. And what is not directly visible appears in the achievements, in the functions of life. Thus it is with the little embryo in an egg yolk. It may well be possible to construct something which has a similar appearance, but no bird will grow from it. In the embryo, however, not only is a bird predetermined, but a bird of a definite genus, species and variety. It is demonstrable that not even one moneron* would grow out of little globs of protein that we might scatter about.

And actually there is no *generatio aequivoca* in the strict sense either, just as there is no spontaneous generation. Pasteur's experiment is decisive on this point, too. (A distinction is made between *generatio spontanea* and *generatio aequivoca.* The latter is supposed to allow a new organism to grow out of something already organized, e.g., out of simple putrefaction.)

297. Given that things are as they are, if someone still wants to maintain the possibility of the spontaneous generation of an organism out of inorganic matter, this might seem risky, but under the assumption of quite an extraordinarily favorable chance combination of circumstances it seems it is not yet to be rejected with all decisiveness. But if someone maintains the absolute necessity of such generation in any conceivable original situation, then this is a contention which clearly flies in the face of the truth.

298. It will become apparent to you how great the general embarrassment is in which the advocates of the hypothesis of blind necessity find themselves here, when you consider that people have resorted to the idea that vital germs once fell from the sky. A meteorite could have brought a present of one seed to the earth, whereupon the development of life got going here. This way out was thought up by no less a scientist than Helmholtz. But how impracticable it appears to be! In the

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* The monera are supposed to be the lowest of creatures, hypothetical protozoa, like amoebas except without nuclei. (Tr.).

first place, never has anything organic been found in a meteorite, such as a grain of seed; and secondly, it is scarcely possible to assume that it wouldn't be destroyed already before landing on our earth. Zöllner sharply attacked Helmholtz on account of this hypothesis, and pointed out that such a stone is glowing when falling toward the earth. Helmholtz did reply that it glows only on the outside, because of the incredible coldness of outer space, but it does not glow on the inside. But how is the seed supposed to have survived the process by which the meteor was separated as a chip off some planet? In all probability, the planet--concerning which it must naturally be assumed that it harbored organic life--was destroyed by a collision with some heavenly body. But such a collision must have produced quite a colossal increase in temperature. But if the planet fell victim to a volcanic eruption, then when its crust cracked the whole surface must have been flooded by a fiery, molten mass. If we avoid Scylla, we fall into Charybdis. (Besides, meteors seem to be more closely akin to comets.) In addition, it is clear that by means of this meteor hypothesis the whole difficulty of seed formation is not disposed of but only postponed. Where does a seed come from, then? From a plant. And again, where does this come from? From a seed. Well, was it always like this? Then we're facing a fortunate accident. But if it wasn't, then again we face the question: How did the organic arise from the inorganic? That this once came to pass is just as probable as the Laplacian hypothesis, according to which everything was once in a gaseous state such that organisms did not exist. Thus no difficulties are disposed of by the Helmholtzian effort, rather fresh improbabilities are added.

299. Thus we see the hypothesis of blind necessity halted at its very first step. Even in the attempt to explain the generation of the first organisms it coincides with the hypothesis of chance, since it presupposes exquisitely favorable conditions for this. But if it doesn't want to make this presupposition, then it must displace the appearance of teleology from the organic to the inorganic realm, where it turns up infinitely augmented. Then we have to imagine inorganic nature to be constituted in such a way that without further ado, and given any conceivable constellation of its parts, organisms must grow out of it. What is thus taken away from the appearance of purposefulness by avoiding the assumption of an exquisitely favorable primordial collocation of bodies is given right back to it by the close affinity of inorganic nature to organic nature.

300. b) But let us set aside the question of how the first organisms came to be. The hypothesis of blind necessity also meant to explain, with the exclusion of every teleological factor, as something self-evident, both the *development of higher organisms out of lower ones* and the

development of an immense variety of species out of one or a few originally given species.

The sole major attempt which has been made in this direction is the Darwinian theory. But it does not withstand an impartial critique. The faith which many place in this doctrine rests essentially on the fact that they take its case to be identical with the case for evolution. Quite unjustly so, for it has been proved neither that evolution was possible in no other way than that proposed by Darwin, nor even that it actually is possible that it occurred in this way.

301. By this I do not at all mean to cast doubt on everything that Darwinism maintains and presupposes.

Above all, there is much evidence in favor of the hypotheses that the variety of species was formed out of a small number, and that highly developed structures were formed out of relative simplicity, somewhat as a bird comes from an egg and the two sexes come from the same seed.

Moreover, much of what Darwin draws upon to explain this evolution is safely assumed. Thus the overproduction of vital germs and the struggle for life which is connected with it; it is safe to assume that in this struggle the more perfect, or at least the relatively better endowed, have the advantage; it is safe to assume that this situation promotes the perfecting of living things. And since over the course of time a development toward perfection did occur, the overproduction and the struggle for life resulting from it have surely contributed to this.

302. But that is not to say that this principle has been the single and sufficient factor in development, nor even that it was the most preferable means to progress. And if this is not the case, then the hypothesis of mechanical necessity, as presented by the Darwinian attempt at explanation, has not done what it was supposed to do.

It has not achieved this from either of the viewpoints from which we considered organisms, neither from the point of view of their great beauty, nor from that of their being apparently highly purposefully devised machines.

303. The aesthetic side is less heeded by the hypothesis of blind necessity. Indeed, the creature capable of greater achievements may have the advantage in the struggle for life, but how could a more beautiful creature have an advantage? To be sure, if we consider the human species in particular, it is possible to point out the power of beauty in such choices as bear upon the propagation of the species. But such a basis of explanation abandons us increasingly in the case of animals. It may be that in higher animals there is an analog of the human preference for the beautiful, but still it is dangerous to assume that their aesthetic outlook coincides with ours. (Even the Chinese have quite different taste.) A

preference for what seems more beautiful to us--be it in the same or even in a different species and class--is not established by experience in the case of higher animals. Still less is the principle to be applied to the lower animals, which have no sense of sight, or to the plants. And nevertheless it is precisely here that the splendor of foliage and flowers charms us. Of course, the animals have been cleverly enlisted in this regard, in that it has been noticed that insects, e.g., bees, prefer certain beautiful flowers. But this is an instinct only for fragrance and bright colors. No, the lily of the field, whose raiment surpasses the glory of Solomon, obviously remains unexplained in respect of its beauty by the hypothesis of mechanical necessity. To say nothing of the microscopic beauty of its parts, to which Heraclitus' saying may well be relevant, namely, that the invisible harmony is even more beautiful than the visible.

304. But I do not wish to dwell any longer on the aesthetic aspect of organisms, and prefer to go on to their mechanical efficiency, upon which the Darwinian effort rests the greatest weight. Here it believes itself completely certain of success, and many thousands follow it with devout confidence. I am unable to share this confidence, and on the contrary would rather like to declare categorically that the Darwinian attempt to explain evolution is not a safe assumption, indeed, it is plainly refuted.

Darwin's explanation is not a safe assumption.

305. Where would the arguments be, precisely, which would be able to lend it assurance?

I. Many say that the fact of the evolution of higher organisms from lower ones is not to be doubted. But it is impossible to understand this *otherwise* than as Darwin explains it, therefore this principle of explanation is safely assumed along with evolution. In this sense Dubois Reymond thought Darwinism is the plank we have to cling to in order not to drown.

But is that even really an argument that can survive before the tribunal of logic? May one reason thus: "Otherwise I couldn't give any explanation at all, therefore this must be the right one"? What would be said about a jury which argued: "We must find the defendant guilty, because otherwise we do not know who did it"? Is it self-evident, then, that we are able to comprehend the phenomena of nature? Isn't rather the opposite true in thousands of cases, indeed to a certain extent in all cases? And in particular here: Do we comprehend the origin of life by spontaneous generation? Or even just the repetition of ontogeny? And how are we to understand phylogeny before we understand the origin of life?

306. So this argument is certainly quite weak. And it is all the weaker, if the struggle for existence really is the true and sole vehicle of development, insofar as we fail to understand completely the process which leads to progress. After all, we would have to understand heredity. But this is shrouded in the deepest obscurity. So what prevents us from saying: Nature, which in ontogeny develops the more perfect out of the less perfect in a way mysterious to us, had already in phylogeny produced the more perfect out of the less perfect in a way equally mysterious to us? Our pride may veto this, but logic does not.

307. II. The following argument sounds stronger:

The overproduction of vital germs is a fact; further, the struggle for existence is a fact, the advantage of the best adapted is a fact, natural selection is a fact which operates in a way favorable to perfection. We can, and must, expect as results of this significant transformations and the generation of quite new, apparently more purposeful characteristics, *first* of all because we see that artificial selection effects them (e.g., kinds of pigeons), and *secondly* because in individual cases we can occasionally imagine quite well how this came about. Think of mimicry, for example (by means of colors and configurations from the environment, or one animal looking like another for protection, or butterflies and the like imitating leaves, and so forth).

Therefore, since we have on the basis of assured facts a principle which could lead to an understanding of such special features, why should we still look for other reasons in order to explain the various differences of the higher and lower organisms? "*Entia non sunt multiplicanda praeter necessitatem,*" [Entities are not to be multiplied beyond necessity] was Newton's fundamental principle.

If we draw on this basis of explanation for the formation of the so-called species and classes, too, then it offers us the explanation of some other phenomena at the same time. Thus

Thirdly it explains the "infinitesimal" (I would say, "unnoticeable") transitions which occur frequently and, by analogy, are probably to be presupposed everywhere.

Fourthly it explains the proportion between the amount of variability and the number of species, which indicates that it is thanks to the easy transformability in any direction that there are such a great number of species.

308. But this second argument, too, is of limited logical force:

1. as regards the inference based on the analogy with artificial selection.

In two respects it is an inference *a minori ad majus*, whereas in order to be convincing it should be an inference *a majori ad minus*, or at least an inference from equal to equal.

a) It is an inference *a minori ad majus* insofar as artificial selection has the advantage of a guiding and isolating intelligence and therefore it works much more energetically.

In natural selection the important factor of isolation, above all, is missing. If a breeder wants to develop a certain characteristic, he isolates the appropriate specimens which present something like it. But nature does not proceed likewise. If some favorable variation has appeared, there are still specimens present which do not have this characteristic, and as a rule there is free cross-breeding between those that have it and those that do not, whereby the difference gets blurred again. (Where there is isolation, however,--perhaps by means of migration--the struggle for life is no longer applicable.) Nevertheless, it could happen that common advantages are developed gradually, but the lack of isolation would still remain such a hindrance, and would have to slow down the development so much that the comparison with artificial selection is not to be admitted readily. A less amazing phenomenon is there, and a more amazing one is inferred from it.

309. b) It is an inference *a minori ad majus* insofar as artificial selection, however eye-catching its achievements may be, still only achieves something so small that it scarcely compares with what is under discussion here (*a minimo ad maximum*).

α. Has artificial selection ever gone so far as to produce a species which could never revert to the species from which it derived? Quite the contrary! Not only is it possible by means of artificial selection to turn new breeds back into the old ones, but in the wild they revert all by themselves (Atavism).

β. And there is more. Never has it happened that a teleologically significant new body part has been produced by artificial selection.

γ. Indeed, it can be said that artificial selection has never produced differences as great as those arising by other means in nature (e.g., by transfer to another climate). Not only is artificial selection unable to reinforce a given perfection in another climate, but it cannot even preserve one. Therefore American sheep and Arabian horses which breeders work with in Europe always have to be maintained by a supply of breeding animals from the native country, so that their qualities will remain first-rate. People would have liked to have transplanted North sea oysters to the Mediterranean, but once there the species altered itself.

If people wished to counteract this, or to produce in the North Sea a species like what is achieved in nature by the change of place, artificial selection would never accomplish this task.

Who would dare to maintain, under such circumstances, that length of time must compensate for all these difficulties?

310. 2. As for the *case of mimicry*, something quite similar may be said. It is an argument *a minori ad majus*, whereas logically the opposite would be required. Also, the argument is not at all as well- suited as some imagine it to be to the prized "clarity" of the process by which natural selection may have accomplished this remarkable, apparently teleological means of protection. For the protective characteristic might have developed differently by means of unnoticeable changes. And if the differences were unnoticeable, how are they supposed to have had a protective effect? Surely some leaps have to be assumed here, then, if the struggle for life is to play a role. But they are precisely what the theory does not want to admit elsewhere, where it is a question of phenomena of incomparably higher teleology.

Ultimately, one could doubt whether even under the assumption of such leaps the cases of mimicry can be explained by the struggle for existence. That is, nature shows us several very remarkable dispositions for this kind of imitation. Certain fish change their color as soon as they are placed in different water by taking on its color. That doesn't happen accidentally, but by virtue of an apparently very teleological disposition internal to them (which is lost, oddly enough, when these fish are blinded). A similar example is the tree frog, which becomes light green in sunlight, dark green in the shade.

The advocates of natural selection will assert, of course, that this disposition has been developed by means of natural selection. It may be so; but that it is so is just what they have to prove. The only fact established for the time being, however, is that in certain stages of development organic nature can effect an adaptation by means of mimicry in other ways, too. This suggests the idea that organic nature was capable of this originally, as well, in keeping with the apparently teleological character it has been shown to have possessed from the beginning anyway, by virtue of the peculiarities it has in common with inorganic nature.

311. 3. As regards the appeal to *unnoticeable changes*, it seems that experience is not very favorable to it, either.

The species which exist now, when compared with the remains of those we ought to regard as their ancestors, always exhibit quite considerable differences. What is supposed to have become of the transitional forms which were between our contemporaries and those species which are very different from them, but generally related, and which constitute the available remains? All the most sharply demarcated groups make their appearances quite abruptly. Even in the case of horses, whose phylogenetic tree tends to be cited as a well-maintained one bearing witness of continuity, there is no proof of a formation of the species by means of small and continually repeated chance variations. And in other forms of life, such as the labyrinthodontia and the trilobita, where the Darwinians believed they had demonstrated gradual changes, this has turned out to be a mistake on closer examination. What were taken for the remains of separate, less persistent species are in truth the remnants of immature, not fully developed specimens of the same species. So, as with Empedocles' deformed creatures, there is nothing to be found of Darwin's gradual transitional stages, either.

312. This lack of transitions seemed to significant scientists like Baer and Mivart to be an insuperable objection to development itself. Others have a different view, of course, and believe it is sufficiently explained by the imperfection of inheritance. They may not be wrong about it, but one cannot call their interpretation *assured.*

However, it is precisely if such a gradual transition from generation to generation were assured that the struggle for existence would no longer need to have been its sufficient cause, nor indeed even its chief driving force. The two contentions are by no means identical. For we have seen just now how progress in the struggle for existence can often be considered effective only when gaps in the process of development are noticeable (in cases of mimicry).

313. 4. Finally, the *proportion between the amount of variability and the number of species* is only a very weak basis for probability, too. The idea suggests itself that even if other factors, and not the struggle for life, were the essential driving forces, a greater transformability would be related to a greater number of products.

The Darwinian hypothesis is highly improbable

314. We have recognized that the assumption which sees in the struggle for life a sufficient, or rather, an excellent means toward progress, certainly cannot be regarded as proved. But I venture to declare, furthermore, that this hypothesis is highly *improbable*, indeed, that it is plainly *refuted.*

Even common sense says that it is highly improbable, and zoologists who have preserved their common sense bear this out. (Thus, e.g., Clauss, *Lehrbuch der Zoologie*, Sixth edition, p. 206.) And this improbability increases if certain limitations are taken into account which underlie the principles of heredity and of variability by the summation of small differences.

315. As far as *heredity* is concerned, the important zoologist, Weisman, argued in a series of writings the thesis that an *acquired characteristic* is never passed on. (An example: In China it has been the custom for thousands of years to deform the feet of young girls by binding them up. All the same, even there every new-born child comes into the world with normal feet.)

Weisman's theory has not remained uncontested. I am no judge of it; but if he is right, certainly the struggle for life would get a lot more work to do.

Without a doubt it faces other limitations of heredity. Thus in changes of climate. Animals transferred to another climate cease to inherit certain characteristics under such changed conditions.

Another limitation is familiar to our fruit-farmers. They achieve improved varieties but can maintain them only by grafting because their seeds produce unimproved fruit.

Quite often, characteristics which distinguish *both* parents to a high degree are not passed on to their descendants. Canaries with pretty tufts have young that are bald. Actually, the cross-breeding of very excellent, similar specimens usually leads to deterioration. Therefore--because of the excessive similarity as such, and not because of their common descent--marriages between relatives frequently have weakly issue with symptoms of degeneration, such as deafness, etc., even when both parents are strong and normal. So the marriage law of most peoples recognizes forbidden degrees of relationship.

But natural selection would be dependent precisely upon the combination of particularly similar pairs--mustn't special difficulties result from this?

316. So much for the limitations of heredity. *Variability*, too, is subject to limitations. The Darwinians set out with the assumption that each time a small deviation will occur in any direction, and that the addition and selective cultivation of it will result in ever more significant differences. But this assumption is correct only with strict qualifications; generally speaking, it is false. If a breeder wants to produce a certain characteristic and make it especially pronounced, the first augmentation of it succeeds quite well, but the second is less striking, and the third still less noticeable, and so forth in a kind of decreasing geometric progression the sum of which will not exceed a certain amount. Rather in many cases there appears a tendency at the same time to revert to the starting point. If it were otherwise, then it would be possible, for example, to breed a horse the size of the tower of St. Stephen's. Even common sense rejects such possibilities, which shows that ordinary experience speaks against limitless variability. The cause of its limitation is obvious, besides. An organism exists because of a peculiar relation among its parts. If one part is changed, so are the others, and what would bring no harm to one of the

parts, considered in itself, can be detrimental to the others. In many species difficulties are apparent from the very beginning with regard to the achievement of significant modifications. So it is (according to Darwin himself) with geese, for example. This is a species of great stability, in contrast to the very variable pigeon.

317. Let us recapitulate: The arguments produced to support Darwinism lack the power to convince. Anyone who trusts them without further ado places more faith in them then they deserve on their own merits, and this overestimation of their probability does rest mostly on the confusion of the general theory of evolution (which rests on much more solid ground) with the Darwinian attempt to explain it. The slim probability which an impartial observer would be inclined to acknowledge for it is even more diminished when one notices the limitations we have just discussed, to which both heredity and variability are subject.

The Impossibility of the Darwinian Hypothesis

318. But not only can this hypothesis be called improbable, it is plainly refuted, and what is especially important for us, it is *not even a genuine form of the hypothesis of blind necessity,* since it includes assumptions which bear the appearance of exquisite purposefulness.

In order to demonstrate this, we will first show the impossibility of applying the Darwinian explanation to certain phenomena which belong, by virtue of their scope and their character, among the most fundamental phenomena in the whole realm of living things.

Then we shall take a look at the length of time which this hypothesis claims development required, and ask whether the facts allow us to think in terms of such periods of time.

319. I. Under the first heading I emphasize three points:

1. the first formation of new organs,
2. the further perfecting of structures which have already developed a high degree of perfection,
3. the cases of apparent teleology which can be counted as advantages to the preservation of the species only partially, or not at all.

320. 1. The difficulty of explaining the *first formation of new organs* by means of the principle of selection is unmistakable, and has already been pointed out repeatedly.

Take, for example, the rise of a sighted creature from an unsighted one. How is this supposed to have happened according to Darwin's hypothesis? Obviously there is not supposed to have been an organ which appeared all of a sudden and was capable of mediating visual sensations. The process is not thought to be such that, while the parent organism hadn't the beginnings of such an organ, the offspring immediately appeared on the scene with the whole sensual apparatus. Instead, this apparatus and its accoutrements are supposed to have arisen quite gradually from a long series extending through millions of organs within which an initial, primitive appendage developed more and more, because among the multitude of variations, those preserved themselves which approached the perfect visual organ more closely while those further removed from it perished. The situation was similar with all other body parts, for even among the vertebrates the lowest forms have no feet.

The whole thing appears to be nature playing dice. Even the first appendage was likewise a lucky throw. Of course, the appendage which thus varied remained far, far removed from the condition of being able to see, but nevertheless it was already on the way there. And since, according to Darwin, what is relatively more perfect survives better, so did this appendage survive. Now there might occur, perhaps only after generations, a second lucky throw. Thus the differentiation progressed further and the endowment with a visual apparatus moved one step closer. Even this relative perfecting signifies an advance in the struggle for existence, and the less favored specimens perish beside it.

321. So the procedure is always as follows: Before the time when the organ was able to exercise its proper function there had to have been an enormous number of lucky throws, i.e., favorable variations. Of course, these variations do signify progress when judged by the idea of a completed organ, e.g., an eye, but yet are without the possibility of exercising the function they prepare for. Therefore it is not inappropriate to compare an organ at this stage with the condition of rudimentary members.

But if such is the necessary assumption of the Darwinians, who could fail to see that their principle of explanation threatens to leave them utterly in the lurch? *Why* is the relatively perfect always preserved in the face of the more imperfect? Obviously not because it is the preparation for something more perfect, but because as what it *really* is it already achieves more and brings advantages to the struggle for existence. Therefore, if their principle is to be applied to the origin of the ability to see, then just as a practiced eye has the advantage over one less sharp, so must each less rudimentary appendage have the advantage over more rudimentary ones because of its already *actual* achievements. Now who does not recognize that this is a very precarious assumption? We thus face a huge gap which the struggle for existence is not able to fill. Why is it that between the first appendage and the final stage of development the more perfect and more advanced function has always been maintained? Darwin's hypothesis still owes us an answer to that. But what is left, then, of the whole attempt to explain the appearance of teleology in organisms, if the origin of organs is inexplicable?

322. This would be the immediate big objection to Darwin's attempt at explanation. Of course, people have believed they'd found an answer: In those preparatory stages in which the organ is not able to exercise the function for which it is formed, it is naturally unable to provide any advantage by means of that function. But nothing stands in the way of the assumption that it would have provided an advantage in some other way. For we really do find such functions not infrequently in rudimentary members. Also, the analogy between the parts of different animals supports this: The wings of a bird are the analogues of the arms of a human being, the fishbladder is the analog of a lung, and the like. So an organ might have performed a series of different functions at the different stages of its development. And since these were continually replacing one another, the organ was able, in the struggle for existence, to develop through to that state of highest efficiency which seemed inexplicable to us.

But I believe that this answer is indicative of the logic which one often encounters in the Darwinians' reasoning. The function which the organ exercised before it was able to operate in the later sense was of quite a different nature. Thus it is quite certainly not self-evident that the gradual perfection of the earlier achievements includes at the same time an increasing disposition for that quite different function which as yet it cannot exercise at all. And if that kind of relation does obtain nevertheless, then it gives rise to the appearance of a highly teleological coincidence, by virtue of which, taking everything into consideration, a creature approaching one capacity is always at the same time being perfected for its quite different, real functions, too, in such a way that it is victorious over other creatures. That would be something which is not at all involved in the Darwinian hypothesis, an entirely new presupposition which, far from explaining away the apparent teleology, evokes this appearance to a high degree and thereby gives rise also to the need for an explanation.

323. So it has become clear that for Darwin the way to new organs is absolutely impassable without the aid of new and apparently highly teleological principles. It would be much easier for the Darwinians to explain a degeneration and vanishing of organs in this way. If, under changed circumstances, they were no longer useful, then any reduction of this excess baggage would yield an advantage such that the struggle for existence would easily let them become rudimentary or vanish altogether. In fact, all the rudimentary members we actually find in nature are regarded as degenerations. When Theodor Fechner compared the success of this regress with the failures of progress, he came to the paradoxical idea that perhaps the fact of the matter is that the most complicated organisms occurred at the beginning. Koelliker expressed a similar idea.

It is evident that this would be to renounce any blind, mechanical explanation of the appearance of teleology, even though it does not agree with my ideas on teleological development and is to be rejected, upon deeper consideration, from every point of view, philosophical as well as directly empirical. Everything points to a greater simplicity in earlier states, above all the analogy between ontogenesis and phylogenesis. But that such an opinion could arise is characteristic of the force with which the state of affairs just discussed obtrudes.

324. 2. Just as they could not explain the new formation of organs, the Darwinian principles are also unable to explain the *further development beyond a state of high perfection which has already been achieved*; at least not without the aid of entirely new and apparently highly teleological assumptions.

In applying the principle of variability, Darwin neglects to take note of a question which is very important on my view, namely, how many of the conceivable modifications which a variable organism can experience will be improvements, and how many will actually be changes for the worse. The proportion here is surely not a matter of indifference. If just as many improvements as changes for the worse are possible, then it really is probable that in the struggle for existence an improvement will occur. But if more changes for the worse are possible, indeed many more of them, then their quantity would outweigh the chances for improved quality. From the survival of the fittest it follows, at best, that the surviving offspring will be better than those that perish, but not that they will be better than their parents. Further consideration shows, however, that the more a high and exquisite usefulness is already achieved, the more the numerical proportion alters to the disadvantage of improvements. For then any deviation is a blind deviation from an exquisite state which seems to be most cleverly calculated for some purpose.

325. Now if this is true, then an increasing improbability does not favor the occurrence of further, genuine improvements, even if a single improvement has a better chance than any other single improvement. Instead, degeneration will be brought about by further deviations.

Let me illustrate these thoughts by means of an analogy. Suppose someone has succeeded in constructing a machine which not only continually renews itself as an individual but also, by assimilating material from the surrounding nature, constructs a little machine out of itself which would then grow to the size of the first machine--in other words, a self-propagating machine. Will it be probable that this machine will develop progressively forever? Or that where they deviate the descending machines will be even more perfect machines? I think any sound mind will expect the opposite. The machine is quite ingeniously devised. Blind deviations will surely occur, but in the sense of deteriorations. Of course, it is not inconceivable that an occasional improvement will occur, too, but in any case there will be many more changes for the worse. And therefore everyone will expect that if modifications happen at all the machine will degenerate more and more until finally it will no longer function. The case is quite analogous for higher organisms, or actually for any organism, since each one presents itself as an exquisite mechanical work of art, beside which our machines are insignificant.

326. Another analogy: suppose someone possesses a very successful portrait of a deceased friend. Nevertheless, it has its small imperfections, the owner carries a still more faithful picture of the deceased in his heart and wishes to have one like it on the wall. What to do? He hits upon the idea of having the painting copied a thousand times by skilled painters and then selecting from among the copies those in which the deviation consists in an increased similarity to the deceased friend. Then he has these copies copied a thousand times again, in the confidence that in time he will get a perfect picture from this continual process. Will the man reach his goal? Or will the original still prove to be the best of all? Obviously the latter will be the case; only increasing disimilarity will come of the procedure, assuming that the portrait really was a good likeness. Occasionally one of the copies may be superior to the others in competition with it, but it will not be superior to the original itself.

If we presuppose that in nature the situation is different because there an easier variability toward the good is the rule, then we are resorting to a principle *which lies quite outside the scope of Darwinism.* If we stick to his point of view, then, as we saw, neither the first formation of new organs nor the perfecting of forms already quite perfect can be understood.

327. 3. I mentioned yet a third class of phenomena for which the principle of selection proves to be quite obviously insufficient. They are those cases of apparent teleology in living creatures which can be brought under the viewpoint of serviceability to the preservation of the species only with great effort or, as it seems to me, not at all.

Among these there are to be included above all certain phenomena which outrank all others and which we marvel at in the human race as distinct from the animals: The fine arts, philosophy and the other liberal disciplines, and certain moral phenomena such as selfless love and the satisfaction taken in caring even for the elderly, the sick, the incurably insane and others from whom neither the individual nor the race can ever expect any equivalent return. These phenomena rank higher than mere life, whether of the individual or of the species. "Life is not the highest of goods." Therefore Aristotle sees our purpose more in activity than in being, and more in the activity of the intellectual life than in that of animal life, and in this latter more than in the activity of vegetative life.

In the face of such well-known circumstances one finds it strange when a theory would explain all these values simply from the point of view of usefulness for the preservation of the species, and with such complete indifference to the higher things of which the theory itself is one. Would nature ascend to such dizzy heights in order to achieve nothing more than what it achieves in each infusorian while remaining at the very lowest level? To be sure, given the mutual relations between each and every thing in nature, it cannot be denied that the higher things are in many ways promoted by the lower things, and vice versa, the lower by the higher. And so the higher things could have been forced up there because they're required by the lower things. But if this can be conceived of for life in general, as we said before, only under the assumption of a very improbable and therefore apparently highly teleological combination of conditions at the outset, then it seems plainly inconceivable in the case of those highest phenomena of all which I just mentioned.

328. Plato and Aristotle had pondered over the origin of the liberal disciplines. They believed it possible to explain them only on the basis of a powerful drive to know, a purely theoretical interest. Plato said philosophy springs from wonder, and Aristotle not only repeated this but also went on to explain that first what proved to be useful and what proved to be agreeable was discovered, before, where people had leisure, the higher disciplines appeared which freely seek the truth alone, without regard to use or agreeableness.

Naturally it is not to be denied that in the wake of theoretical investigation abundant advantages appeared. But that was not its motive. A proof was of more value to Democritus than all the treasure of the Persian king, and an Anaxagoras rejected the cares of material gain and public honor, saying, "The heaven is my fatherland, and the investigation of the stars my calling." The plentiful fruits of such labor often resulted only after millenia of theoretical efforts. In this the sciences are like those organs of living creatures whose first formation we spoke of: they cannot be of service in the beginning to those purposes which they serve later on. And even when the time has come for such practical results it is usually others who are credited with being their investigators and discoverers. A Kepler, who accomplished such great things, fell victim to hunger. His poverty did not allow him to possess even one copy of his own, immortal works. And if the learned professions have become somewhat more profitable in recent times, nevertheless even a Comte still places the idea of the purely theoretical interest in opposition to the struggle for existence.

329. The same holds also for the fine arts, which practical natures, or even one-sidedly directed theoretical minds, therefore frequently underestimate. I recall a place in John Locke on the art of poetry, which he says

does not bring any real advantages and without which the human race, though perhaps it would not be as happy, would still certainly partake as much in the struggle for life. Whether Austria will be preserved by its music remains to be seen.

Of course, it is possible that the fine arts nourish their man, too; an

Arion sailed in the days of yore
Laden with gold from Taranto's shore,*

and a Rossini and Liszt are not second to him in harvesting gold. But how can these outward results be explained except under the presupposition of a general predisposition of the human race? And it is the development of this predisposition which is at issue. Suppose everyone lacked an ear for music, what disadvantage in the struggle for existence would arise for creatures from that? What we said earlier about the charms in the works of nature, that they cannot really be explained by natural selection in the struggle for existence, holds also for the charms of art. Nature, as a biased selecter, would rather have had to strive against all such emotions-- as Ovid's father did against the poetic impulses of his little son--until they were eradicated without a trace.

330. I mentioned yet a third class of most sublime phenomena: They are such as we find in the ethical realm, selfless love and the satisfaction taken in caring even for the elderly and incurably ill (from whom a corresponding return can no longer be expected for the promotion either of the individual or of the species), the care of parents until their death with devoted attention and then the deepest sorrow over their loss. From the point of view of an advantage in the struggle for life one would sooner judge these tendencies to be false sentimentality. To turn our backs on those who no longer make a contribution would be to further the species. Therefore these feelings should not be developed in the struggle for life, they should be weeded out instead. What should govern the situation is--I don't want to say egotism--but a healthy *species*ism . Everyone who has passed a certain age or at least shows real signs of decrepitude must be regarded as a natural enemy, and the disabled should not be pensioned but poisoned instead. In fact, in the French revolution suggestions of this sort were made, but as with so many other absurd notions the passage of time washed them away. Now as ever before, indeed ever more resolutely, charity looks after even the crippled and the hopelessly infirm, whereas dogs will treat a sick dog--like a dog. In a human being, at least in a whole human being, everything resists such harshness, and yet the effort expended in his works of love is wasted as a service to the preservation of the species in the purely biological sense.

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* Arion schiffte goldbeladen
einstens von Tarents Gestaden. (Tr.).

331. In addition to these phenomena which are close to us as human beings, I would like to mention yet another one taken from a realm further removed from us which has cost the Darwinians, and even Darwin himself, much puzzlement. For it also presents, and in a most striking manner, a case of apparent teleology which cannot be considered of service in the struggle for life. It is the case of a body part the apparent teleology of which seems to aim, not at the advantage of its own organism but at that of other living beings. In many organisms there are artfully constructed organs which thus appear to be determined for certain functions that seem to be calculated, not for the interest of the organism to which they belong, but rather for that of another organism which is thereby threatened in an unfriendly way. Thus, for example, the rattle of the poisonous and very dangerous rattlesnake. It is impossible to explain this organ on the basis of sexual attraction since both sexes are equally endowed with it. It was thought that it held a fascination for the animal serving as prey, thereby making it easier to overpower. But observations at the London Zoological Garden refute this notion, though it seemed *a priori* to have been a good one. It was thought that the rattling is similar to the sound of running water, the idea being that thirsty animals could be enticed by this. But the similarity is so remote that this attempt at explanation only betrays the magnitude of the embarrassment into which Darwinism has fallen here. The situation is similar for Darwin's own idea, that hostile birds are scared away by the rattling, since the sound is not nearly loud enough to be something frightening. And even if it had this effect, contrary experience would have to have taken the edge off it and attraction would have replaced the fear, indeed with time it would have become an instinct. For actually, according to the Darwinian principle the sound peculiar to the rattle would have to have become more and more of a warning signal from generation to generation, such that the struggle for existence, far from explaining the origin of the characteristic, would instead have had to have had the effect of weakening and eliminating both the hostile birds' fear and the snakes' rattle. But despite all this, Darwin does not doubt that it will be possible somehow to give an account of the remarkable phenomenon. For the matter is of utmost importance to him. If a single case could be established of an organ not being of use to the species itself, then he would give up his hypothesis. And if in other cases he is not so utterly embarrassed and is better able to present something plausible by way of explanation, still there is something loose and problematic about his procedure in those cases, too. One is not convinced that the possibly conceivable course of events was also the actual one. For as we all know, everything in the world has two sides to it. Therefore one cannot be satisfied with having discovered some advantage, but must rather also be assured that it really is more advantageous than disadvantageous. One-sided observations lead to incompatible results. And principles which explain contraries equally

well in truth explain nothing at all. For instance: One could prove that there must be nothing but poisonous plants, and on the other hand, that there cannot be any. The latter, because the animals susceptible to the poison must already have died out, the former because among plants the poisonous ones have the advantage in the struggle for existence.

332. So much for the third class of cases which I had to include under the first point. I believe I've said enough to justify enumerating them all. But I haven't satisfied myself concerning this third class as I had in the other two. I believe that here, with more perfect investigation of the facts, it will be possible to discover many more cases of incommensurability between the apparent teleology of the organic world and the considerations of usefulness to the preservation of species, and to shed more light on the incommensurability itself in the case we just mentioned, too. This should still be a field for much valuable philosophical and biological research.

On the other hand, what I said about the first two classes--about the cases of nascent organs and about the progress made beyond degrees of high perfection already reached--should scarcely be lacking in anything essential. Thus the impossibility of applying the principle of selection to an abundance of the phenomena most characteristic of nature, without the aid of other and apparently highly teleological principles, should be irrefutably proved by what has been said.

333. II. Now, however, we shall test the Darwinian hypothesis from yet another point of view, namely, the *length of time* which would be taken up by the development of living things.

Of course, the Darwinians believe they are safe from all difficulties. The length of time would involve no objection, because the time during which the surface of the earth has been capable, by virtue of its physical conditions, of supporting living things, can be regarded as infinite for all practical purposes.

But it is doubtful whether this contention is justified. The thought suggests itself that on this point nothing at all can be settled upon as probable. Nevertheless, in recent times the great English physicist, Thomson, carried out a three-fold investigation into the question of how long the physical conditions on the earth have been such as to allow the development of organisms.

In the first of these studies he looked to the influence of the tides on the rotation of the earth. (They tend to impede the rotation and transform it into one similar to that of the moon in which the day and the year coincide.) In the second study he took as a starting point the probable length of time during which the sun has illuminated this planet. In the third the temperature of the earth's interior formed the basis of his calculation.

This three-fold inquiry yielded identical results: The period during which the earth's condition permitted the existence of organisms cannot have lasted more than about one hundred million years. But within such a period nothing remotely like the world of organisms which we now find on the earth can have developed by means of gradual selection in the struggle for existence.

334. This is immediately apparent when the results of artificial selection which are achieved over a great number of years are multiplied by the appropriate factor. Such results remain far inferior to what would have to be achieved (Mivart). Never, not even once, would a new organ be formed. Koelliker points this out in his history of the *pennatulidae*. Here he says it is always just a matter of increasing or diminishing parts already present in size, form, number, color, etc., never a matter of a genuinely new formation, and there is no case in which artificial selection has produced a new organ that wasn't there before. Now if we compare the first organisms, those contained in the oldest layers of the earth's surface in which any evidence of life remains, with those of the present day, then we recognize how impossible it would be to bridge the gap between then and now by means of the gradual modifications of an artificial selection continuing over thousands and thousands of millions of years. And yet it is evident from the outset, and has been expressly conceded especially by the Darwinians, that unconscious, natural selection by means of the struggle for existence can only work extremely more slowly than artificial selection does.*

For one thing, because there is no isolation. This is a great hindrance, which has led many to doubt that natural selection plays any role at all in the principle of evolution.

Another reason** is the necessity for many individuals to undergo the same favorable modification at the same time, if there is to be any hope that this modification will prevail by means of natural selection. Suppose a single individual has doubled its chances of preserving its species as a result of some favorable modification, then it is as though this individual has two lottery tickets while thousands of others each have one. Now what is more probable in such a case, that the one which has two tickets wins, or that one of the others which have one ticket wins? When he was informed of this objection Darwin conceded, in his noble candor, that until then it had escaped him and that the correctness of the observation cannot be contested. "If, for example," he himself noted, "a bird of some species could acquire its food more easily if it had a curved beak, and if one were produced with a sharply curved beak, then this *one* individual would still have only an extremely small chance of propagating its species under supression by the usual form."

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* The Darwinians usually say, in order to offset this disadvantage with an advantage, that through natural selection works more slowly, it also works more lastingly than artificial selection does. But how can this be?--At first it doesn't seem that such a difference should be expected. (For it is precisely the products of natural selection which are relatively quickly changed by artificial selection.) In fact, what they say makes good sense in one way only: Since natural selection always works so slowly, it will work about as slowly in transforming a thing as it does in forming one. And therefore the slowly formed product appears to be very durable. If the matter is viewed thus precisely, the argument is found to be strengthened that formations by means of natural selection take up incomparably longer periods of time.

** First put forth in an astute article in the *North British Review*, June, 1867.

But the simultaneous alteration of many individuals by one and the same favorable modification is itself a thing of utmost improbability. Let us assume that a certain, chance alteration has the probability 1/2 of occurring in an individual, then the occurrence in 100 individuals of the same variation at the same time has the probability $(1/2)^{100}$, or less than one nonillionth.

Thus we see what an extraordinary delay the perfection by means of natural selection must suffer to allow for this.

335. Another reason why the development is delayed is the law of correlative variations, by virtue of which each characteristic which suffers modification brings with it the modification of other characters at the same time. If a variation in one organ means an advantage, then it must first prove to be the case that the accompanying variations in other organs do not turn out to be predominantly harmful. This is the reason why, as we've already heard, the arbitrary accumulation of one and the same variation all by itself is not possible.

In addition there would be the mentioned necessity for Darwinism to assume periods of stability between the times of progress, indeed periods of stability so extended that the times of progress become insignificant by comparison.

336. After all this we have to say that even if the threefold result of Thomson's investigation (which no one has refuted) were not nearly but rather only remotely correct, indeed even if a period a hundred or a thousand times greater could be granted, and if in addition it could be assumed--which is obviously not admissible from the point of view of blind necessity--that right away at the first moment of this period lumps of protein or even microscopic living organisms had formed, nevertheless the development, by means of gradual perfection in the struggle for existence, of the living beings we now observe, would be utterly out of the question just *due to lack of time.*

337. So from this point of view, too, the result is that it is impossible to explain the development of the higher, more complicated organisms out of

protozoa by means of the principle of natural selection alone,or even chiefly on this basis.

This untenability of Darwinism inflicts yet another *defeat upon the hypothesis of blind necessity* as an explanation of apparent teleology.

We first found it inapplicable to the appearance of teleology in inorganic nature. Then to the transition to the first organisms. Now again to the development of higher organisms out of lower ones.

Or could someone say, perhaps, that if the Darwinian hypothesis proves to be inadequate, what prevents our assuming that the development can be explained in some other way by means of blind necessity, and that the appearance of teleology explains itself without the aid of an intelligence or a wonderful coincidence?

This question is not to be answered until it is more precisely stated. Without the aid of a directly intervening intelligence or coincidence? Why not? Because even in ontogenesis such factors play no role.--Without the aid of an intelligence which *designed things from the outset*, or a coincidence which united amazingly exquisite conditions at the outset? Certainly not without one of these!

This answer is the clear result especially if we consider that the Darwinian hypothesis is in any case the simplest conceivable. But that more complicated hypothesis naturally includes something wonderful in the agreement of the original conditions, whether it has the species of organisms developing by leaps and bounds or gradually. Moreover, and this is the most telling consideration, even this simplest conceivable Darwinian hypothesis is still crammed full of apparently highly teleological assumptions, the explanation of which by means of blind necessity must be renounced.

It seems that Darwin himself did not fail to appreciate this, and therefore he was no more an opponent of teleology than Lamarck was, although Häckel considered both to be definite atheists.* And recently Weismann energetically advocates teleology again, though he is a Darwinian despite Darwin himself.

According to Darwinism, development is supposed to take place of necessity, on the basis of certain laws, such as those of heredity and variability. And these laws are by no means self explanatory but, if they really do lead to development, infected with the highest appearance of teleology. They bear a relation to development analogous to what holds for the inorganic world or for an embryo with respect to the mature fruit.

338. If someone says that this would mean a definite weakening of the appearance of teleology, because it is just a matter of a few laws, then I

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* Häckel was not reluctant, after the death of Darwin, to publish a letter which contains nothing more than the confession that he was not a faithful adherent of any *positive* religion. But for Häckel this proves that Darwin was a "monist" (i.e., a materialist).

reply: The number of laws is not so small, and even if it were smaller this weakening effect would not occur as long as the special character of these laws is noted.

a) Darwin enumerates a whole series of them in the first edition:
1. Growth and reproduction;
2. The law of heredity,
3. The law of variability;
4. The law of overproduction.

And in addition, interfering with everything,

5. a law of correlative variations, and according to our arguments
6. a law of the discharging of functions in the formation of new organs (much more wonderful than the usual variety of applications; since the extremes, which are useful, are widely separated, it would sooner be expected that the bridge between them can only be built by intermediate organs which impart no advantage whatsoever). And
7. a law of the relative ease of forming more perfect organisms, which is required at each step, repeating itself millions and trillions of times.

If these laws are viewed individually nearly all of them have an expressly teleological character, and the combination of each with the others appears to be one of the most artful interweavings.

b) Also they are all secondary laws and thus to be analyzed into several others and these in turn into incalculably many laws, right down to those governing nitrogen and carbon, etc.

So what I said is confirmed, *the Darwinian hypothesis coincides with the hypothesis of chance--or rather with the teleological hypothesis.* But since there is no way it can be replaced by a simpler one, the result is that *the hypothesis of blind necessity is absolutely inapplicable at every point.*

New Theories for Explaining Evolution

339. My expositions of the proof showing the impossibility of the Darwinian hypothesis as an explanation for the appearance of teleology in the development of organisms were very concise and certainly not complete. Yet they do suffice to show anyone who has followed them carefully how untenable Darwin's attempt at explanation is. But how could such a poorly supported assumption find so many capable advocates? And what about the arguments in *favor* of it? Such questions surely occur to you, too, and so a concluding remark on the significance of the Darwinian hypothesis might be in order.

340. Its adherents may be divided into three groups. Some find no difficulty or obscurity in it. They believe that with it the veil is lifted from

the development of organisms and the secret of their teleology revealed. For a Häckel, Darwin is the Newton of organic nature.

Others are less enthusiastic. It does seem to them, too, that the hypothesis poses no difficulties, but they do not hide the fact that it leaves much obscure and offers no ultimate explanation. The laws of heredity and variability are not ultimate laws, after all, and the cause of variation, especially, remains hidden from us. We know--they confess--what regulates development, but not the specific forces which motivate it.

Still others--and among them the most distinguished minds--are clear that the assumption made by Darwin's explanation faces the greatest difficulties, and that the explanation is in itself an extremely risky one and of colossal improbability. Nevertheless, they think, it must be adhered to because it offers the only means of accounting for otherwise incomprehensible facts. Thus for DuBois-Reymond Darwinism is the plank that the shipwrecked cling to in order not to drown. And in fact, if an assumption which is very improbable in itself is the *single possible hypothesis* for explaining a certain fact, this raises it to a certainty. Of course, it would be different if the assumption were *impossible*. In that case, what is grasped at is not a plank but a straw. The view that every other explanation is ruled out must be a mistake, then, and one must either content oneself with a subjective *ignorabimus*,* or else take a fresh look around.

341. What is the situation in our case? What is primarily the fact to be explained? It is essentially this *one*: the evolution of organisms out of other, lower species. This fact cannot be denied in view of the many grounds presented for it. Now if we compare these with the grounds advanced for itself by Darwinism, we find they are substantially the same. The more important arguments of the Darwinians are, to begin with, one and all arguments for the theory of evolution, and are therefore regarded as arguments for Darwinism because it is believed that an account of evolution can be given in no other way except through natural selection. If a demonstration were produced to the effect that development can be thought to have occurred in a different way, then everything which supports Darwinism would immediately fall. Now this demonstration can be produced and it has been produced. There is another hypothesis which doesn't seem nearly as desperate as Darwinism, and this completely removes from Darwinism any right to existence.

342. Darwin has the development of more perfect organisms (such as are present today) occurring by means of an immense series of quite small, one might say infinitesimal alterations, which can sum to infinity in each

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* The allusion is to a phrase of DuBois-Reymond which became a common saying, *ignoramus et ignorabimus* (i.e., "we do not know, and we never will know."). (Tr.)

case in every direction possible. With regard to the infinite sum of alterations, Darwin requires too much for evolution, and with regard to the immense series of infinitesimal alterations, he requires too little. There often are sudden, significant deviations such that organisms descended from like organisms, or even from the same one, differ considerably from one another. The odd sheep appears with a long, woolly body and short, bent legs; or a bull without horns, or a human being with six fingers. Birds that develop in an incubator at temperatures significantly higher than the natural hatching temperature, turn out unmistakably different.

Of course, these are in part examples of freaks; yet they bear useful witness to the fact that in the same seeds there must be the capacity for an immediate, quite significantly different development. And this capacity is used by nature (regularly) for the production of widely diverse organisms having essentially different, apparently teleological development. That the two sexes can develop from the same seed is evidenced by the fact that certain organs of the one are possessed in rudimentary form by the other. But the motivating factor behind this differentiation was obviously not the struggle for existence, such that from among an immeasurably greater number of intermediate and unteleological forms only a few have one of the two teleological forms, of the masculine or the feminine sex. Nor is it the case that in the earlier stages of foetal development progress is made step by step while thousands of less successful formations are done away with.

There was rather undeniably, even in the first seeds, a dual capacity, an apparent predisposition for the development of two kinds of organisms according to the particular conditions which may occur (and concerning which physiology is still unable to give an account), each of which appears in some special way to be highly teleologically formed. (As a result the difference between the two sexes is often so great that they fail to be recognized as such and, for example, the male is taken for a parasite of the species. Sexual dimorphism. In many animals this differentiation branches out into four forms.)

343. Similarly, if we really mean to put into practice the analogy between ontogenesis and phylogenesis, we must consider the original, simple organisms. We must assume they had a multiple capacity, a multiple apparent predisposition for the development of more perfect organisms, each of which in its own way appears to be highly teleologically formed. The seeds of the original organisms, though under certain conditions they were able to produce, and did produce, organisms of the same species to which they themselves belonged, were so constituted that under altered circumstances their development led to more or less different species of organisms better suited to the altered circumstances and usually or even always more perfect considered in

themselves. If these circumstances occurred, then an abrupt transition took place which we can designate as heterogenesis (*generatio heterogenea*) along with Koelliker,* who advocated this evolutionary hypothesis, as did a significant number of other distinguished naturalists, such as Nägeli,** Heer, Claus, Rätimeyer, His, Brou, Grisebach, Wiesner, Mivart and others.

Such abrupt transitions, or cases of heterogenesis, must occur repeatedly, however. That is, even the seeds of organisms developed in this way must likewise have had a multiple capacity for developing into organisms of different species. When conditions remain the same, the same organisms develop; when conditions are altered heterogenesis occurs. If this is assumed it is only that the analogy with foetal development in two possible directions is really put into practice.

344. But we have more which serves to recommend this hypothesis than this analogy, namely, real examples of such abrupt transitions or cases of heterogenesis in the world of organisms. Greater differences than have ever been achieved gradually by breeding arise suddenly between progenitor and offspring.

Mivart presents (*Op. cit.*, p. 97) several examples of sudden modifications which, as he remarks, are not less than the difference between *hipparion* and *equus*. English oysters taken to the Mediterranean abruptly altered their manner of growth and formed protruding, diverging radii like those of the native Mediterranean oysters. Sir Charles Lyell reports a case of Italian greyhounds taken along by Englishmen enlisted in the Real Del Monte company. They are one of the best species for hunting hares but could not endure the strain of a long chase in the thin atmosphere. Their young were not in the least bothered by the thin air.

Perhaps more important still are the cases which Koelliker presents (*Die Geschichte des Pennatulidenstammes*, pp. 12, ff.).

In their successive generations, that is, in what happens before our very eyes, so to speak, we have examples (according to the assumption made by the hypothesis) of what also occurred earlier and repeatedly and in general,in order to bring about progress in the organized world.

345. Other cases present a phenomenon not quite the same,but one in which a related natural tendency is exhibited. These are the cases in

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* *Zeitschrift f.w. Zoologie* 1864, p. 181, "Entwicklungsgeschichte des Pennatulidenstammes." On page 25 he calls it "development due to internal causes."

** *Entstehung und Begriff der natürlichen Art*, Munich 1865. (According to Koelliker in *Die Geschichte des Pennatulidenstammes*, p. 27, this is the best work which has been published on the subject.)

which an animal goes through several changes from one living creature into a different one until the most perfect form of the species is developed. (Tadpole to frog; caterpillar to butterfly, etc.) Many pass through a whole series of transitional forms and appear in the final form to be animals of an entirely different species and genus, so that often the connection is only belatedly discovered by science. These metamorphoses are analogous to the succession of generations.

The most curious facts in this regard concern certain intestinal worms. Their eggs are often found in quite incredible numbers, however they develop, not in the vicinity of their parent, but apart from it, usually in the water where they live in a different form as worm-shaped larvae. Many of these have long been taken for separate species of worms. The larvae tend to be called "nurses" when they produce buds from which independent larval forms again proceed, the last of which finally assumes the form of the parent and bores its way back into the host animal. It also happens that one of these larval forms lives in a particular animal, and it is only when it manages to get out of this one and into the body of the right different animal that it develops to its completed form.

So it is with the tape-worm, the bothersome parasite of man, of which the species called the common tape-worm grows to a length of 50 feet. Its head is the size of the head of a pin. In its broader parts it contains a multitude of eggs which, if they manage somehow to get into the heads of animals, develop into the so-called bladder worms that until recently were held to be independent creatures. Thus in the fat of pigs there are bladder worms from the size of a pea to the size of a walnut. In the brains of sheep there are the *coenuri*; consisting of a bladder the size of a hen's egg with several scolices, in the human liver there is the liver fluke, and in domestic animals the *echinococcus veterinorum*. A bladder worm of pigs, which manages to get into human beings by the consumption of pork, has been shown to transform itself into the perfected form of the tape-worm.

346. As was said, this case is not of the same significance as that mentioned earlier in which it was a matter of different, fully developed species capable of propagating themselves. (The development of the tape-worms proceeds in a circle, whereas the successive generations of species proceed lineally.) But it is unmistakable that certain related natural tendencies are revealed here, namely, a certain variety of developmental capacities is exhibited by the fact that *frequently certain transitional forms are passed through, and frequently they are passed over.* Something similar is shown by the following fact: tadpoles maintained in the dark remain tadpoles, but when light is admitted they develop into frogs. A vast difference! The former are cartilaginous fishes, the latter a higher form than bony fishes.

347. Another related fact is presented by what we had occasion to remark upon with regard to individual body parts (compare Mivart, Ch. 8). We find that if we cut an annelid in two the tail end grows a new head. In some of them, such as *syllus* and *nais* for example, even without their being cut in two a new head is formed at certain intervals instead of a simple segment, and then the animal spontaneously divides into several animals. (This shows the capacity of a body part to develop in a variety of different ways.)

Again, reference could be made in the same sense to the formation of all the different organs of a developed organism from an original blastula consisting of uniform cells. All this is evidence in favor of the assumption of *a variety of apparent dispositions for development in the same seed.*

348. Also, this assumption of abrupt transitions from organisms to other organisms having essentially new characteristics is in agreement with what the inorganic world exhibits. Thus, for example, sulphur undergoes different modifications under various physical conditions; it always crystalizes regularly--whether cold or heated to the boiling point--but the crystals formed are quite different. Something similar is true of phosphorus.

In the change of the state of aggregation there occurs an abrupt transition to an entirely new state with apparently teleological properties which are quite different but, as we see, characteristic.

349. For this reason Cuvier was an opponent of the theory of evolution, because he only had the Lamarckian explanation in view, which blurs the species just as the Darwinian explanation does. In the opinion of this great man, the theory would be against the fundamental interests of science. A systematic biology would thereby be made impossible. According to our interpretation of evolution, however, this objection is inapplicable.

So on the one hand, this evolutionary hypothesis can summon much greater evidence for itself, and on the other hand it avoids all the objections which are valid against Darwinism. Indeed, since these objections are absolutely unsolvable, it is obvious that if the evolution of organisms out of simple, original forms actually did occur then this must be explained either by a vast series of accidents accommodating themselves in the most fortunate manner, or else in the way we propose.[27]

According to our explanation, too, development occurs by mechanical necessity.[28] There is no resorting to fresh, direct interventions by God. Nevertheless, the opponents of a teleological world view are much less inclined to accept it than they are to accept Darwinism.

350. The reason seems transparent enough. For this development of more perfect species from original, simple ones detracts no more from the

apparent teleology than does the mechanically necessary development of a single perfect foetus from a simple egg. Precisely because the bird comes to be by mechanical necessity out of the egg it is necessary that the egg have quite a definite disposition and structure which are ruined by the slightest deviation. Such disposition and structure appear to be one instance among many equally possible instances. The situation is similar for the evolution of species from original, simple forms of life; indeed, it is much more wonderful both

a) with regard to the apparently predetermined design of the seed, such that the new ones are always better adapted to the new conditions which effect changes, and also

b) with respect to the apparently precalculated physical conditions, whose succession determines, not regression, but progress, and whose coexistence seems wonderfully to produce competition for a predetermined goal.

At each stage, the developments of the different hereditary lines have to agree, not only with the inorganic conditions, but also with each other. This is so clear that there are advocates of this view who do not at all wish to speak for the teleological world view, just as there are many physiologists who, without intending to, must often speak as though they assumed there is a purposeful order in nature. Thus, for example, in the *Zeitschrift fur wissenschaftliche Zoologie,* Koelliker expresses it as his "fundamental idea" that "a great plan of development underlies the origin of the entire organic world." And in his paper on the developmental history of the *pennatulidae* he says: "My basic view, therefore, is that with the first emergence of organic matter and organisms the whole developmental plan, the entire series of possibilities, was given potentially. This plan had a determining effect upon the separate, distinct stages of development, and stamped them with a definite impression."

That such a way of viewing things leaves intact the appearance of the most wonderful teleology Häckel, and others sharing his turn of mind, understand. But they hoped to be able to get rid of it by means of the Darwinian explanation.

We have seen that this hope has not been borne out. The struggle for existence may indeed have some small role to play; but if it would serve as a universal principle of explanation it overestimates its own power* and runs the danger of the frog in the fable.

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* Even where it seems most likely to be applicable, the connection often proves to be quite different upon closer examination. (See Strickers on amoebas and on the colors of fishes.)

II. COMPARISON OF THE HYPOTHESIS OF AN ORDERING INTELLIGENCE WITH THE HYPOTHESIS OF CHANCE

351. Our demonstrative procedure is fundamentally simplified by the result of our discussions so far; the hypothesis of blind necessity is no longer eligible to explain the apparent teleology. So of the three hypotheses only two remain in the competition--the hypothesis of an ordering intelligence and the hypothesis of chance. And in keeping with the plans laid down earlier it is now our task to establish *their relative probabilities*. If one infinitely surpasses the other, then it ceases to be a hypothesis and becomes a complete truth proved with physical certainty.

The calculation of these probabilities will not be especially difficult, for when it is a question of infinite discrepancies we may leave mere finite quantities out of consideration. The procedure is simple, too, and many things that we have already discussed in the introductory sections will be of help to us in this. Nevertheless I request your intense concentration, since the inquiry is dry, but it contains the nerve of the whole proof. Here it will be decided whether the question is one of rhetorical dialectic or of genuine, scientific proof.

352. Let us first consider the hypothesis which takes the apparent teleology to be a *real* one, since it traces this back to a superhuman intelligence as its cause.

Here--according to Laplace's sixth principle--we must:

1. ascertain the unconditional probability of the existence of a being capable of having such an effect; and

2. then determine the probability, *if* such a being did exist, that as a result there would be an apparently teleological order in the world.

When we have ascertained both ratios of probability, then they are to be multiplied together.

353. The unconditional *probability* that there is a being capable of ordering the world, even that it is an infinitely perfect, thinking being, is not infinitely small. We have previously determined that *a priori* there is as much to be said in favor of it as there is to be said against it. Thus the probability that there is such an intelligence is 1/2; but for us it suffices to be able to say that in keeping with the data available to us the assumption is by no means infinitely improbable, since we no longer need to take into account the differences between finite quantities.

354. But this is obvious with reference of the *explanatory value* of the hypothesis.

Whatever we may think about the freedom and self-sufficiency of such a being, in keeping with which it would be conceivable that it abstains from all creative activity, still such creation is not infinitely improbable *a priori*. Either it loves and desires only itself, or, since it loves and desires itself it also loves and desires something else which is like itself,on account of the similarity to itself. Its act is not more perfect than itself, in that case, for it does not love a more perfect thing; but obviously its act is not less perfect either. (Perhaps it would not be hard to demonstrate *a priori* an overwhelming, indeed an infinitely overwhelming probability in favor of its creative activity. But we do not wish to engage here in more subtle inquiries. For us it suffices if a finite probability is conceded for this.)

With this it is clear that, under the assumption of the existence of a being, even of an infinitely perfect being, capable of ordering the world, an apparent teleology in the world is in any event not infinitely improbable.

And since a finite fraction multiplied by a finite fraction can never result in an infinitely small quantity, we see that we obtain a finite probability for the first hypothesis.

355. Let us turn now to the other hypothesis, the hypothesis of chance, in order to determine the unconditional probability, as well as the probability of the fact to be explained under the assumption of the appropriate chance collocation.

No doubt, the latter is to be set equal to 1, i.e., equal to complete certainty.

What remains to be examined is only the unconditional probability of the existence of beings with universally suitable characteristics and laws, such as those of a chance, purposeful collocation of beings which must lead to an appearance of teleology like what the world exhibits, by steady transformation under the influence of changelessly persisting laws. And *this* probability can only be designated infinitely small.

This will be clear to you immediately if you recall a single one of the factors mentioned earlier.

Let us take a look at the *inorganic* realm by itself. We acknowledged that even one of its simplest features, the fact that bodies exist together in space, is not only not self-explanatory but infinitely improbable, considered as an accidental fact. Infinitely many more discontinuous locations are conceivable even on a plane, or indeed in a line, and each of them is equally conceivable.

But if the bodies are imagined to be moving instead of at rest, and each of them to be progressing with undiminished speed by virtue of the law of inertia, until it runs into another body somewhere, then the total number of those dispositions in which such a coming together will occur, compared with the total number of those which will not lead to that, always remains infinitely small. And thus, since each disposition is equally conceivable in itself, the assumption that a given one of the first dispositions was actualized by chance is still an infinitely improbable assumption.

356. For the sake of clarification, let us imagine:

a) all the bodies originally moved in the same plane (an assumption which is obviously very favorable to their coming together); and

b) let us assume further that their paths all intersected at one and the same point;

c) finally, for still greater simplification, the bodies all moved with exactly the same velocity so that only the differences in their distances from the point of intersection come into account.

This way it is easy to show that even then the coming together at the common crossing point of just two of the trillions and trillions of bodies we may conceive as existing would be an infinite improbability. For indeed it would be infinitely improbable for two of the bodies to be situated equidistantly from the point of intersection, since it would rather be infinitely probable that the differences between their distances from the point of intersection would have been quite extraordinarily large upon comparison with one another. (The ratio of the probability of two bodies coming together in this case is precisely the same as that of their being together given chance stationary positions within a line.)

The situation is this unfavorable even for just two bodies; what if not only two but innumerably many are together? With each additional conjunction the improbability becomes infinitely greater.

357. Let us not forget, on account of this very simple fact that bodies are together in space, all the other facts about the inorganic world which we have already wondered at as being apparently highly teleological. Thus the many-sided relatedness of all with all. We shall consider only a single and comparatively simple feature of such relatedness, namely, the universal law of gravitation, which governs all masses completely equally such that all bodies serve equally well as conductors of the gravitational force. That this should be the case even for two material things among many, *if we do not imagine them to be originally united and thus actually related to one another*, is already infinitely improbable, since infinitely many other situations are indeed equally conceivable. But then how can it be that this uniformity is so pervasive? With each additional body that we bring under consideration the improbability is once again infinitely increased.

358. Hereafter I will no longer take under consideration the other laws which are universal for the entire physical world, and in particular the chemical connections. We saw earlier what an appearance of the most intimate mutual interrelatedness is aroused by the elements of the process of chemical combination. And after what has already been presented, there is no need for further explanation of the proof that here again, if everything is to be attributed to chance, infinitely infinite improbabilities result.

Nor will I dwell further upon the wonderful fact that in nature there are elements which, by means of transformation in chemical processes are able to become organisms, indeed, to become bodies capable of consciousness. Surely it is clear what the result of such an analysis would be here, when even the comparatively insignificant facts we have analyzed turned out to be infinitely improbable.

359. I shall take a quick look only at the wonderful structure of organisms as it is really given, in order not to let these facts go entirely unnoticed in the examination of the probability of the hypothesis of chance. To less reflective people these are the only facts which make an impression of being very likely teleological, and in the teleological proof, too, it is usually almost exclusively these facts which are taken into consideration.

It does not take a great deal of thought in order to figure out that here, too, the probability is an infinitely small one. We can argue *a minori ad majus* here, as is done freely in all the sciences and also in mathematics. Thus, instead of turning directly to organisms, we first consider a work of art, whether something aesthetic or an artfully constructed machine. In both respects, with regard to beauty as well as with regard to their wonderful productive power, organisms do leave the products of human art undesignably far behind. So let us consider a clock or one of its gears, a factory or even just a steam engine or a wheel or a hollow cylinder in the steam engine. Or a painting, or even just one head in it; the Laocoon group or just the head of one of its figures--who does not understand immediately that the assumption that such a thing has arisen by chance in the fortunate collocation of materials, or that it has accidentally existed somehow without a beginning, is infinitely improbable? Everyone emphatically denies these possibilities, and quite without feeling that one must actually travel to the moon in order to make a survey of whether formations of the same kind have ever occurred there by accident.

But if this assumption is infinitely improbable, what about the assumption that the human organism proceeded from a chance collocation? For this is of such incomparable, thoroughgoing teleology, of such wonderfully complicated structure, that even if one looks at just a single part of the body is has quite incomparably higher beauty and productive power than a statue or a painting has.

360. In order to heighten the idea we shall allow an objection to be raised. Perhaps, someone might say, the elements of the organic world are such that it is easier for an organism to be produced from them by chance than it is for a much less artfully constructed object like the Laocoon group.

The answer is simple: We do not need to show first that the nature of the inorganic elements does *not* include the property attributed to them by this objection. (Although even that would not be hard; at any rate, experience does not speak in favor of it. We do see repeatedly that crystal formations come to be before our very eyes, but not that organic things proceed from inorganic things. Obviously the elements are particularly inclined to form crystals, but not to form organisms. And the transition from inorganic to organic, without the direct intervention of an intelligence, can only be thought possible on the assumption of quite an exquisite combination of conditions.) *Assuming*, however, that this is the case, then surely the improbability of an accidental correspondence of the external dispositions of the elements would be decreased, but the improbability of a chance correspondence of the *internal* dispositions would increase. So on this view the contribution made by chance remains undiminished. How does it happen, one must ask, that the elements are so constituted as to form, with incomparably greater ease, a chiselled organism rather than a real one? If this is a matter of chance, then the more wonderful the structure of the relevant product is, the more wonderful is this factor of chance. In short, it remains an infinitely infinite improbability.

361. So what is the final result with regard to the hypothesis of chance?

In the realm of living things, as well as in that of lifeless ones, the apparent teleology can be traced back to accidentally occurring collocations and dispositions only with infinite improbability.

Thus the hypothesis that this teleology is not merely apparent, but rather objectively given, is infinitely more probable than the hypothesis of chance. And since one of the two hypotheses must necessarily be true, the first turns out to be physically certain. *With this it is strictly proved that the apparent teleology has an intelligence as its creator.* Anyone who wishes to deny that our proof is binding must deny the inference from a skeleton to an antediluvian animal, from the harmonious regularity of the celestial phenomena so far observed to the laws of gravitation and inertia. Indeed, even the existence of America or England must appear doubtful to him.

362. The conclusion which we have just drawn was the most important in the entire course of this proof. I have left no room for doubt

that I regard it as perfectly correct. Its truth will appear even more clearly, I believe, in the investigation of certain objections, some of which are directed against our comparative determination of the probabilities of the two competing hypotheses, others against the inference drawn from this.

1. *Objection*

The probability of the first hypothesis, the hypothesis that there is a creative *intelligence*, was not determined correctly. It is rather a matter of explaining this particular order. However, countless orders are possible for the omnipotent artist, and therefore each individual one is infinitely improbable *a priori*.

Reply

This is true: It is certain merely that God wanted to actualize some order--a particular order is infinitely improbable *a priori* on account of the infinity of possibilities.

However, it is false that we are dealing here with the explanation of this particular order. Rather what should be made understandable are only the general characteristics of order, without which no order whatever would be possible: The relations among things, the complementarity of their actions, their being together in space as the external condition of action, the existence of living beings. (Apart from conscious and rational life a world order would hardly be conceivable, at least not a valuable one.) *This general character of order* is to be explained, not its special and individual properties--and this our hypothesis achieves with infinitely greater probability.

(Even the prediction of *this particular* marble group, of this size, this shape, with these figures, etc., would be infinitely improbable *a priori* ; and yet the inference from the statue to the sculptor is still rational.)

363. 2. *Objection.*

The probability of the second hypothesis, the hypothesis of chance, is not determined correctly. The arrangements which have a teleological disposition are indeed infinitely few by comparison with the total number of those actually possible. But in an infinite period of time, given the steady alteration of respective positions, a regular, apparently purposeful arrangement could be actualized after infinitely many irregular ones. Then, as a result of the advantages it would offer, it could preserve itself or even evolve to a greater perfection.

Reply.

The objection appears to be rather superficial.

a) First of all, there are a great number of teleological features which neither are nor depend upon spatial relations, e.g., those which even the nature of the elements displays, the universal unity of similarity and of related forces.

b) Others, such as the fact that bodies exist together in space, are infinitely improbable even given an infinite period of time, since two straight lines intersect only at *one* point, even if they are extended to infinity in both directions. Therefore the number of intersections of the paths of bodies is finite, and however large it may be it is infinitely small and insignificant by comparison with the infinite variety of possible directions to be taken into account.

c) Finally the objection disregards the fact that there are infinities of lower and higher orders. We frequently found chance to be infinitely many *times* infinitely improbable, subject indeed to an infinite improbability of an inexpressibly higher order. So even if the infinity of time would make such an arrangement infinitely easier, still the result would only be that the order of infinite improbability would be less by one, i.e., $1/\infty^{n-1}$ instead of $1/\infty^{n}$. Thus for example, if it were a matter of an infinity of the second order, the improbability would remain infinite, and all the more so if, as is the case here, it is a matter of incomparably higher and higher orders of improbabilities.

364. 3. *Objection*

There is a conceivable objection also against the certainty and validity of the method of inference: infinite improbability yields no certainty, since even what is infinitely improbable occurs and is believed *a parte post* without any opposition.

Given a die with infinitely many sides, the probability that one particular side will turn up is $1/\infty$; nevertheless one does fall, no matter if it is the side with the first or the trillionth number. Or suppose that a ball is rolling on level ground and comes to a halt right at the edge of the shadow of an object standing there. *A priori* no one would have believed it, *a parte post* we believe it without any reluctance. Infinitely improbable things occur again and again, and here something infinitely improbable has to happen wherever the ball might stop. So why shouldn't something infinitely improbable have been realized in our case, too? Instead of the elements which agree so beautifully in their forces and characteristics, there might have been others that didn't agree; instead of the positioning which makes possible the interplay of their forces, there might have been from the beginning a different, dispersed arrangement which would never have made that possible; but these, too, would each be *one* instance among infinitely many. The unpurposeful arrangement is just as improbable as the purposeful one, but it would be accepted *a parte post* as a fact without any misgivings, and no rational person would ordain a special cause of it, say, a special Disorderer, because something so improbable couldn't be attributed to chance. So why such astonishment in the face of the purposeful arrangement, and the recourse to an infinitely perfect mind as its cause?

Solution

365. This objection betrays a complete misunderstanding of the laws of probability. Of course, these are little known, and even those who have studied logic haven't been able to navigate in them on account of the shallowness of the usual logic textbooks.

Above all, if this rationale is correct then no law of natural science deserves our trust. We would no longer be able to infer the occurrence of volcanic eruptions from the craters on the moon; for what provides this conclusion except the idea that it would be infinitely improbable for a chance arrangement to look like this? We would no longer be able to infer the existence of antedeluvian animals from the fossil finds in the lower strata of the earth's surface. Indeed, we would have to renounce every inference from effect to cause in natural science, and moreover deny any proof of natural law. For all the laws of chemistry, and physics, etc., are established in no other way.

In order to demonstrate this by example, let us take one of the laws which are regarded as proved above all the rest, for example the law of gravity or that of inertia. Of course, all the movement and rest of the heavenly bodies agrees with the assumption that the law of gravity is true. But, someone could say, we must not on that account be convinced of the existence of such a law, nor build our houses, as well as every kind of calculation and expectation, on the basis of it. For if the phenomena of rest and motion were to occur in some other sequence, which would contradict this and any other regularity, then without assuming any law (which would be impossible to do) we would regard this as the play of mere chance. But if chance is not limited by any law, the most regular order has as much of a chance as some particular irregular arrangement. And thus according to the view put forth in the objection it would only be inconsistent to posit some binding necessity, some reign of law here on account of the regularity of phenomena.

You see, surely, that in the same way the law of inertia and likewise every law of physics and of natural science generally must be rejected as an arbitrary and groundless contention.

Thus natural science would be negated, but also the most certain conclusions of history and archaeology would be destroyed with it. The discovery of a monument with inscriptions, e.g., an obelisk, the discovery of minted coins, the discovery of a statue of Apollo or the discovery of a temple could not at all be regarded as evidence of an earlier culture and art. That there was once a Greece flowering with art and learning would be an assumption warranted by nothing. Indeed we could say more. Even that there is now a Greece, or to name more famous and influential places, that a Rome or Paris exists, would not be a certain truth. For even if thousands give spoken and written evidence it could all just as easily indicate a concurrence of accidents only apparently dependent on the real existence of such a city.

366. Let us pause and multiply examples no further. For these are more than sufficient to drive the objection to absurdity. Let us rather show wherein the peculiar mistake of the argument consists. Why is it that in the one case we accept a hypothesis, which is infinitely improbable considered itself, without resistance and with full conviction, while on the contrary in the other case we reject a hypothesis with all decisiveness because it is infinitely improbable?

The answer is very simple.

The probability with which a hypothesis is to be accepted or rejected is determined not only by the probability considered by itself of the assumptions made in it but also by the ratio of this probability to the sum of the probabilities of all the hypotheses that could conceivably take its place.

a) So if an assumption is infinitely improbable considered by itself, but it is the only one under which an indubitably established occurrence is possible; or if the probability of the assumption, though infinitely small considered by itself is nevertheless infinitely greater than the sum of the probabilities of all the other assumptions that could take its place; then such an assumption is to be accepted as a fact proved with complete certainty. (That is, in the first case its probability is $= (1/\infty) \div (1/\infty) = 1$, in the second $(1/\infty) \div [(1/\infty) + (n/\infty^2)]$, which is equal to $1 =$ certainty.)

b) Furthermore, if the occurrence to be explained can be explained by one or several assumptions, each of which has an infinitely small probability considered by itself, but none is infinitely less probable than the others, then each of these hypotheses has a finite probability and is therefore neither to be assumed with certainty nor to be rejected with certainty.

c) Only when an assumption by which an occurrence could be explained, and which is infinitely improbable considered by itself, is opposed to an assumption of finite or at least of infinitely greater probability, is the hypothesis then to be rejected with perfect certainty as being infinitely improbable.

But so it is in our case. The assumptions of the hypothesis of chance, which are infinitely improbable considered by themselves, are opposed to the hypothesis of intelligence as being infinitely less probable. And thus the falsehood of the former and the truth of the latter are established with perfect certainty.

On the other hand, in case the world were to lack any purposeful order, the hypothesis of chance would be the only possible one, though no less complicated and intricate considered by itself (at least, it would be more probable than any other). And therefore the existing collocations and dispositions of things could be attributed unreservedly to chance.

The certainty of all natural scientific, historical, and geographical facts is to be explained similarly, too. They are physically certain, not so much because the opposed assumption of a merely accidental coincidence of circumstances is infinitely improbable considered by itself, but rather because it is infinitely more improbable than another possible hypothesis.

367. However, the objection is still not perfectly disposed of.

Of course, it has been shown, someone could say, that the hypothesis of an intelligence is infinitely more probable than the hypothesis of chance. And the conclusion has been proved incorrect that, because an unordered positioning of things would be traced back without objection to mere chance, therefore the same could easily happen in the case of an orderly positioning of things. But nevertheless, the hypothesis of an intelligence seems not to be completely certain, rather it still seems highly uncertain. For it does seem to be true that what is infinitely improbable happens again and again, and so even here the infinitely probable can be false and the infinitely improbable true. Physical certainty, far from being an equivalent of absolute certainty, seems not even to deserve the name, since we are deceived by it in the most numerous cases.

Reply

If what is said here were true then, of course, that would be the end of physical certainty. But the *opposite* is true. It never happens that something, which is held to be infinitely improbable by rational assessment of the ratios of probability, nevertheless proves to be true. But in the case of a die with infinitely many sides--if one turns up is this not something which any rational person, asked about it beforehand, would have declared to be infinitely improbable?

Without a doubt! But what is to be denied with all decisiveness is that when a particular number was cast with such a die the question has ever been presented to anyone with respect to the same particular number. Nor will this ever be the case in the future. Likewise with respect to the billiard ball that comes to a stop at a particular point.

Of course, it happens continually that something, which we would have had to declare infinitely improbable if we had asked ourselves, nevertheless actually occurs. But it never will happen that something which we have really, correctly declared to be infinitely improbable proves to be true despite this. The number of judgments that are actually made by people is finite, and therefore what is infinitely improbable for each single case of judgment is infinitely improbable also for the totality of judgments. And so it is even a physically certain law of logic that a judgment based upon an infinite probability never goes wrong, and thus that an infinite probability is in fact a perfect equivalent of absolute certainty.

Here the mathematical proposition that $1-(1/\infty) = 1$ is perfectly proved to be true.

368. Thus the third opponent, too, is defeated, the one who wanted to contest our right to our procedure of inference. Now there remains no other aspect of the proof that doesn't show itself to be unassailable. So it is established that the apparent teleology is real, i.e., the work of an intelligence which has ordained purposes for the existence and activity of human beings, animals, plants and inorganic things.

THIRD PART OF THE TELEOLOGICAL PROOF

FROM AN ORDERING INTELLIGENCE TO A CREATOR

369. Now we could ask whether this intelligence is to be thought of as a unity or as a multiplicity. And the obvious suggestion is that it cannot be considered a multiplicity. The unity of the order seems to indicate the unity of the orderer.

We shall not go deeper into this inquiry now but let the question of unity or multiplicity rest. For we shall show first that the intelligent, world ordering power the existence of which we have proved must be thought of not only as an ordering but also as a creative power.

Is this proposition really to be established by means of the teleological argument? Kant has denied it, and many with him. But the success of our investigation will show, so we hope, that here, too, the force of the teleological argument is underestimated.

So our question is whether the work of that intelligent power, to which we have traced the teleological ordering of the world, is to be thought of as a mere transformation and collective ordering of previously existing matter or else as a total causation, as a production without the assistance of a given material, and in this sense as a creation out of nothing.

370. It is possible without much difficulty to establish creation in this sense of it in a variety of ways on the basis of the results already achieved.

Above all, our earlier teleological considerations have showed that the clearest indications of teleology appear, not only in the positioning and relative quantities of the elements, and in other respects, but also in the nature of the elements themselves.

A watchmaker cannot compose his work out of just any previously existing components, since it rather necessarily requires elements of a certain form and kind. Likewise, it was impossible to put together by mere ordering the much greater artwork of organisms and other teleological forms that we find in the world out of just any previously existing materials, none of which had any relation to any other.

As in the elements of a watch there is an order prior to their being ordered, so there must also have been in the elements of nature an order prior to their being ordered. There must exist among them that universal relatedness and those more or less universal laws without which neither an organic being nor any interaction would be possible. And we have seen that anyone who would attribute the existence of just these conditions to mere chance would make assumptions that are infinitely and many times infinitely improbable.

Thus not only is the teleological composition to be regarded as real, but so is the apparent teleology in the nature of the elements themselves which underlies the composition of things. But then the world-ordering, intelligent power must be thought of not only as an ordering force but also at the same time as a creative force.

371. This argument is of great importance. Nevertheless, it is not the case that it admits of no objections.

That is, someone could say it has of course been proved that not only the ordered composition but also the formation of the elements must be attributed to the world-ordering, intelligent power. But no decision has been made as to whether this formation is a creation out of nothing or a substantial transformation of already given, less teleological matter. (For, of course, the hands of a clock are ordered in themselves prior to the order they maintain when they are put together, but they are formed out of less teleological material by means of an earlier intervention of art.) Of course, this would have to have been a kind of transformation that no longer occurs within the cycles of the material world. For here elements cannot be produced except by breaking the connections among them. Therefore, no doubt, an extraordinary and, so to speak, ultramundane power must be ascribed to the world-forming intelligence. But nevertheless this is not necessarily a creative power, even though it may approach that as closely as possible in order to suffice for the explanation of all the teleology in the nature of the elements.

As long as the assistance of some material is not ruled out, our contention is not completely proved.

Of course, someone could say, the existence of that material is itself not necessary, and if it is the indispensable precondition of the world and its order then its existence is teleological in the highest degree.

With this, however, the gap in the proof would be only poorly filled, for the existence of that material, though perhaps it cannot be called necessary, still also cannot be called infinitely improbable. Thus the validity of the proof is weakened. If we are to carry out the proof with certainty and perfectly, therefore, we shall surely have to go about it by another way.

372. But the way has been paved for this, too, in the preceding investigations. If the intelligence is to order a given matter, indeed if it is first to transform its very nature into a teleological one, then this is obviously impossible except if it knows the given matter. But how is this knowledge to be understood.

Only three possibilities are conceivable:

a) Either it has the knowledge of the given matter without any causal connection, by some kind of *a priori* possession, as many also imagine people to have innate ideas and principles.

Or else it possesses this knowledge on account of a cause and effect relation between it and its object, which in turn is conceivable in a twofold way:

b) Either the effect lies in the intelligence and the cause in the known object, similarly to the way we are able to a certain degree to know the external objects which affect our senses as a result of this influence;

c) or else the other way around, the cause lies in the intelligence and the effect in the object. And this, too, would not be without its analogy in the realm of our knowledge since, for example, someone who wrote a letter with chalk on a blackboard in the dark would know it without seeing it. Anyone who would explain in this way the knowledge that the intelligence must have of the formable matter must think of the matter as its work, and thus think of the intelligence as a creative master craftsman.

373. A fourth possibility in addition to these three is obviously impossible. But even of the three cases that we have distinguished it appears that all are not equally acceptable.

In order to understand this, let us first consider the second possibility, which would allow the knowledge of the intelligence to appear most nearly analogous to our ordinary knowledge. The very analogy which recommends this possibility on the one hand is, on the other hand, its weakness. For a highly teleological relationship obtains between our senses and the object affecting them which becomes knowable to them. Likewise the relationship between that intelligence and the matter, which makes itself knowable to the intelligence by its unconscious effect, would also arouse the appearance of the highest teleology.

Even the fact that a passive faculty of the intelligence corresponds to the effective force of the matter, such that these two conditions of influence mutually fulfill one another, is something that cannot be attributed to chance without the greatest improbability. And this the more so the more imperfect we must think the originally given matter to be, according to the previous argument.

Nor does the mere assumption of an effective force in the matter and a corresponding, passive capacity in the intelligence suffice to explain the actual influence. The external relations of both must also be such as the possibility of influence requires. Thus, as we said earlier, bodies could not affect one another if each is located in a separate place, isolated from the others. And it appeared infinitely improbable that in this respect the disposition suitable for influence should have been actualized even for two bodies by means of mere chance. But quite similar difficulties would also underlie the hypothesis now being considered.

But furthermore, just suppose the conditions for the influence of the matter on the intelligence actually can't be regarded as given by chance without the greatest improbability. What then shall we say in particular about the conditions of such an influence, the effect of which is the *knowledge* had by the active principle? Nowhere is the appearance of teleology in nature more wonderful than where, by the influence of light on our eye, extension and shape and location and a variety of other aspects of the illuminated body are made knowable to us.

But the influence of that original matter on the intelligence would obviously arouse the appearance of a yet much more wonderful teleology. And, at that, in the same degree as the knowledge which that intelligence would draw from the influence of the effective object must be far more perfect than that which we are able to get through the sense of sight, indeed, through all our senses taken together. For that intelligence must look deeply into the nature of the matter itself, if it is to accomplish the teleological transformation of its whole nature which we discussed above. And even in the formation of each organism there appears not only an incomparably superior art but also, as its foundation, an infinitely superior knowledge.

Thus, according to this hypothesis, we would again come up against a teleology prior to the teleology, an order prior to the order which must be thought of as the work of an intelligence if any order must be. And thus, according to this hypothesis, it would be necessary to assume prior to the first intelligence a second which, ordering the first intelligence and the matter together in the most highly teleological way, first makes possible their interaction.

374. But something quite similar would become necessary if, following the first assumption, we regarded the knowing of the matter by the intelligence as an *a priori* possession contained in its very nature without the presupposition of any causal connection.

Is the thing known something necessary or something accidental? Obviously something accidental. And this appears clearly in a variety of aspects. Where is it? in what position? what distribution of mass? already moving? and at what rate and in what direction is its motion? Likewise with respect of every other circumstance that admits of alteration. (And according to our earlier discussions this must also be possible with regard to substance.) And not only is the thing known accidental, but its actual existence is one case among infinitely and many times infinitely many other equally possible cases. As, for example, with regard to place.

Obviously, then, even the judgment which accepts this condition of the matter is not a necessary truth, but rather an accidental and *a priori* infinitely improbable one. (Therefore it is not properly to be called knowledge, but at best a very risky though accidentally true contention. But set that aside, since even such a contention could perhaps be sufficiently efficacious.) Thus if someone were to pass this judgment *a priori* without any connection to the object he would then expose himself to the danger of error with infinite probability.

But even so, it would also be infinitely improbable for anyone to pass precisely this judgment, since infinitely many times infinitely many judgments contradictory to it could just as easily be assumed *a priori*.

Thus we very well see that the hypothesis resorts to infinitely improbable assumptions.

Suppose that a judgment, infinitely improbable considered by itself, really did inhere in the nature of this intelligence, placing it in agreement with a reality likewise infinitely improbable considered by itself, and thus making possible its ordering activity. Then this apparently teleological relationship, which is infinitely improbable considered by itself, could not possibly be attributed to chance regardless of what else could be.

Thus, as already noted, this case is similar to the case of the previously considered hypothesis; for we would in fact be forced to assume prior to the first intelligence a second one which would have actualized the precondition of that activity and order by bringing the first intelligence and the matter into that teleological agreement.

375. Thus we very well see what happens, however the knowledge which the intelligence has of the matter to be ordered may be explained. If the intelligence is not accepted as the creator of the matter, then one is forced to accept a teleology prior to the teleology effected by it, i.e., to accept an intelligence prior to this intelligence which first brought the latter into the corresponding relationship with the matter.

But this intelligence, too, must know the matter. And thus the question returns of whether it is merely an orderer or also a creator at the same time. If we say it is not a creator, then this leads to the assumption of a third intelligence. And so we must accept one intelligence after another to infinity as explanation of the apparent teleology in the world, or else accept one first intelligence as creative.

376. We cannot waver in choosing here.

For above all the assumption of such an infinite horde of intelligent powers as explanation of the apparent teleology within this visible world would be an obvious farce.

When Plato imagined, as explanation of the sensible world, the world of ideas, Aristotle pointed out how inconsistent it was that, because he wanted to investigate the causes of visible things, he invented no less than a whole host of other, invisible things in addition to them. "Those," he said, "who posited the ideas as causes, since they sought to find the causes of visible things, have added other things to these in no fewer numbers. It is as though, if one were thinking of counting a quantity, one were to believe that he won't be able to count those few and therefore first added some more to them. But there are just as many ideas, or even more, as there are things for the sake of which the ideas were assumed."

In fact, the objection seems to be well taken, but it could be raised with much more reason in our case, where the number of ordering powers called upon for assistance would be altogether infinite. If one considers that the probability of a hypothesis decreases as its complication increases, then one sees very well that this hypothesis is infinitely improbable. Indeed it would be easy to show that here we have to do with an infinite improbability of the infinitely highest order.

377. But we are in a position to establish the necessity of the assumption of a creative intelligence in yet another way.

That is, the assumption of such an infinite series of intelligent causes would not only be infinitely improbable, but at the same time it would not even be sufficient and would not render dispensable the assumption of a creative cause.

Even an infinite series of secondary causes, that is, by no means makes the primary cause dispensable, since the series is rather itself absolutely impossible without it. This proposition is of great importance and therefore it is necessary that we gain a perfectly clear understanding of it.

A secondary cause is such that it is itself the effect of a previous cause; a primary cause is such that this is not the case.

If something is the effect of a secondary cause, then it is at the same time the effect of the cause of this cause.

Let us consider a series of causes, A-B-C-D-E, such that each succeeding cause is the cause of the one following it, thus A of B, B of C, C of D, D of E. Then obviously F, which is produced by E, is also the effect of D, C, B, and A.

In this case, F has its basis of explanation in this series of five causes.

But not only in these five causes, also in the first four taken alone. For these are capable of actualizing the fifth. And likewise in the first three, and likewise in the first two, indeed even in cause A alone.

And this, too, can be omitted if it is not a primary cause. In other words, an effect which is explained by a series of secondary causes, such that each succeeding cause causes the next, is explained just as well by the earlier causes alone when the later causes are deducted. Thus if, from such a series of causes, I omit each cause which is the effect of an earlier cause, then there must still remain a sufficient basis of explanation for the effect of this series.

Now let us suppose the effect is produced by an infinite series of secondary causes without any primary cause; then obviously, even when we have imagined each secondary cause not to be there, there must still remain a sufficient reason for the effect of the series. But no cause at all would remain; thus the effect would be just as easily explainable without any cause. In other words, anyone who assumes that an effect can be produced by in infinite series of secondary causes without any primary one must also assume that an effect is possible without any cause.* (As an illustration, consider the following: A ring was hanging from another ring, and this in turn from a hook to be found in the ceiling of a room. Who would believe that the hook would be rendered dispensable by the fact that that first ring hung from a second, the second from a third, and so on *ad infinitum*? That would be an illusion, like the Indians' explanation of why the earth rests in space when they imagine it to be borne by four elephants, and each of these in turn by four elephants, and so on to infinity.)

378. The same idea can also be expressed thus: A whole, each part of which is an effect before it is a cause, is an effect before it is a cause.

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* You have certainly shown, someone could say, that a finite series of secondary causes, and likewise even an infinite series of them does not suffice to account for an effect. But a third case seems possible, one which is in a certain sense midway between these two. That is, even if it is impossible for something to be the direct effect of itself, still there is no contradiction is something producing itself indirectly. A cycle of causes and effects is conceivable, and this cycle could be eternal. Perhaps in this way it would be possible for a finite number of secondary causes, each of which is effective infinitely many times, to exist as a closed circle independently of any other cause. This objection has been devised before, but it is a flimsy excuse for not accepting our proof. It may be that many inconsistencies charged against the explanation of an effect by an infinite series of causes are avoided in this way, but it is no escape from our argument. We showed: What is explainable by a series of causes, such that each is the effect of the last, must also be explainable by that series even after the omission of each cause which is the effect of another cause. And so we recognized that to wish to explain an effect by a continuous series of merely secondary causes is as much as to wish to explain something by nothing.

But we can say something quite similar with respect to such an eternal cycle. Each cause here is effective repeatedly, earlier and later, indeed it is infinitely effective. And the effect which is given at a certain moment in one of the cycles must be explainable by the earlier cycles alone without the later ones, insofar as these are themselves produced by the earlier cycles. But then, even when all the cycles, by which the effect given at a parti-

Therefore Aristotle has already rightly said that even though in particular something may be an effect before it is a cause, still overall the cause must precede the effect.

379. If we look at our case in particular the truth just proved appears quite evident. Since each of the preliminary, intelligent powers displaces the next in precisely the position in which it exists itself, it would obviously be just as well if it continued to exist and accomplished the ordering of matter itself. But then instead of the infinite series we would have one intelligence which has knowledge of the matter without having produced it. In other words, the same old puzzle.

380. We see clearly that even an infinite series of merely ordering, intelligent powers does not by itself suffice to explain the apparent teleology in the world. The assumption of a creative intelligence remains indispensable.

Thus we see that all three hypotheses, even those two which do not directly seek to find the reason for the world order in a creative intelligence, are unable to dispense with the assumption of a creative intelligence.

cular moment is produced, are omitted there must remain a sufficient cause of it. And what else is this, again, but to trace an effect back to nothing as its cause? It is possible also in the following way to show how flimsy this excuse is.

A cause can only be a cause when it exists, thus temporal determination is by no means an indifferent condition of its effectiveness. But for the things produced individually in the eternal cycle this condition is different each time they appear. And thus we must call their causes in earlier and later appearances not the same but different. The thing with the later temporal determination could not as such possibly produce one of the things with an earlier temporal determination. Therefore it is obvious that really here, too, we do not actually have a cycle but rather an infinite series of distinct, secondary causes. And so the escape is cut off.

Let us suppose, in order to illustrate the examples used above, that it is not impossible for something to exist in several places at the same time. What would you say if someone claimed in such a case that indeed it is impossible to hang a weight from a chain no link of which is held fast at a certain point but each link of which is held by another and so on to infinity -- but on the other hand that there would be no problem with this at all if we imagine that after the tenth link the first always recurs? Obviously this would be absurd. There is no essential difference between the two cases. And the chain consisting of ten links would nevertheless have to be called a series of infinitely many secondary causes, since the different spatial determinations would allow the same ring to appear as a different cause at each repetition of it.

Now in fact the same holds likewise for the temporal recurrence of an otherwise identical principle. Also, even if not only every tenth link were identical with the first but if every link were identical with every other link, the chain would for the same reason not suffice. And thus, even if it were possible for a reality to be caused by itself directly, the primary cause could never be replaced by that. Rather such a causation of itself would still point to another, uncaused and primary cause.

Without this assumption, the basis of explanation for the world order would be an accidental, apparently highly teleological order prior to the order, and thus would be something infinitely, indeed infinitely many times infinitely improbable. This, as we showed earlier, the assumption of a creative, even infinitely perfect being is not.

At this point, then, this thesis is also established with physical certainty. The apparent teleology in the world, which obliged us to assume a world-ordering intelligence, obliged us also to assume a creative intelligence which has produced the matter itself, which was to be ordered, out of nothing.

381. We have carried the teleological proof to the point that we have demonstrated the existence not only of a world-ordering but also of a creative intelligence. All that would remain now would be to show the unity as well as the infinite perfection of this intelligence, for only when this is done is the existence of God actually proved. The demonstration of the former would succeed without any trouble, and even the latter would pose no great difficulties, as many have thought it would. But, as we said already in the beginning of our investigation, we shall not carry the proof further here, rather we'll pick up the thread of it again later on.

All four proofs do have in common that they first establish the existence of a creator, and only then on the basis of a creator establish the existence of a God, an infinitely perfect being. And therefore if we brought the proof to a full conclusion here, we would find ourselves compelled to make a needless repetition of the same argument. So we would do better, after we've shown the existence of a creator in four ways, to carry the collected proofs from their common point of departure to their common destination.

We come now to the proof from motion.

THE PROOF FROM MOTION

382. This proof stands in a peculiar opposition to the argument previously presented. To be sure, the method is the same in each case, it is not *a priori* as the ontological proof would be if it were tenable. These two proofs proceed on the basis of facts of experience and infer a creator and God as cause from the effect which is inconceivable apart from it. But whereas the fact which forms the basis of the teleological proof is a varied and complicated one, for the proof from motion the opposite is the case. The simple fact of change, of motion or of becoming, to which outer as well as inner experience bears witness and which no one but the most refined skeptic would contest, is the foundation upon which this proof is based.[29]

Therefore it appears to be more conclusive and shorter; it doesn't need to wander through all realms of experience in order to gather up its building materials, and it is spared the defense against many attacks. But of course, the teleological proof, though inferior to this on the one hand, compensates for that on the other with the beauty of the investigation itself and with the vivid impression of the activity of God which it allows us to acquire through the consideration of so many magnificent features of his work.

383. Aristotle was the first philosopher who claimed to infer God as the prime mover on the basis of the fact of motion. He surely had Plato to thank for suggesting the argument.

This proof is based, as mentioned, on the fact of alteration, of which we find such a variety in the world, e.g., local motion.[30]

Such an alteration, such a motion, requires an active principle.

This active principle is either uncaused or else it has a cause, too (being a secondary cause).

But alteration requires more than merely secondary causes, it also requires a primary cause, i.e., one which is not the effect of another cause. As surely as there is change in the world, so it is to be traced back to a first moving principle. Therefore there is an eternal energy which is not produced by something else.

This energy is absolutely changeless, according to Aristotle, and for that very reason requires no cause.

It must be thought infinitely powerful, consequently infinitely real, and thus infinitely perfect as well.

384. The examination of this argument.

Few will be inclined to take exception to the facts which form the basis of this argument. Even the most recent progress in natural science has called forth anything but doubt as to the fact of alteration. Mechanics has become, so to speak, the reigning discipline.

But the fact of alteration, the fact of motion, is conceived in a way essentially different from the way it was conceived in the time when the proof of the prime mover had its origin.

Plato and Aristotle knew nothing of the law of inertia, according to which a body in motion has no more need of an external, constantly energizing mover in order to persist in motion than a body at rest has need, so to speak, of a rester in order to remain at rest. Just as a body at rest requires, in order to remain at rest, only that nothing disturb it, so this is all that a moving body requires in order to continue moving with undiminished speed in a straight line.

Since motion now has no need at all of any cause for its existence, it seems that nothing prevents the assumption that it has existed from eternity uncaused.

All the confident metaphysical conclusions feel the rug being pulled out from under them.

385. For all that, perhaps the proof retains a certain significance if modern natural science has found nothing to explain the motion of bodies other than the law of inertia.

The bodies which constitute the universe are not isolated. We assume that gravitation brings about interaction between the most distant bodies. Masses collide in many ways and it seems, if they are not wholly elastic, that motion is lost thereby. Likewise in any friction. Thus it seems that the physical universe left to itself would have to come to a standstill. Indeed, if one thinks that the world existed from eternity, one could conclude that it must have come to a standstill long ago if the influence of some external, moving force did not incite new motion in it continually or from time to time.

386. But in recent times the law of the preservation of energy was added to the law of inertia. According to this law, "the whole of nature possesses a supply of potential energy which can in no way be increased or diminished. The quantity of potential energy in nature is just as eternal and changeless as matter."(Helmholtz)

After this discovery, it is said, the proof of God as the prime mover is done for.

387. And yet this is not the case. First of all, there is an error to be pointed out, which crept in with the alleged destruction, by means of the law of the preservation of energy, of the proof of the prime mover.

That motion has need of a cause is undeniable; each earlier condition produces a later one, and thus we would come to an infinite series of secondary causes. But we have already recognized that an infinite series of secondary causes does not make the primary cause dispensable. So the conclusion stands that there is a mover which is not itself in turn moved by something else.

388. But there is more to be said. The recent discoveries of physics, so far from pulling the rug out from under the proof from motion, rather serve as its most forceful support.

That is, it is possible to show, with the aid of the law of the conservation of energy in combination with another law, the law of entropy, that in contrast to the Aristotelian doctrine of the eternity of motion, all the alteration that we observe in the world must have had a beginning.

This proof is an experiential proof and holds for the whole realm of physical nature.

But we could generalize the proof that all change has a beginning to include all finite things, since we are arguing *a priori* from the concept of alteration (with variable speed) in general.

This latter demonstration is the easier and more conclusive one. Nevertheless, on account of the extraordinary importance of the matter, I shall not neglect to present the former to you as well.

1. *Proof of the prime mover, based on the law of the conservation of energy and on the law of entropy.*

389. So let us turn first to the proof that within the realm of physical nature alteration must have had a beginning. Here it will be necessary, above all, to explain to you the meaning of the law of the conservation of energy and the law of entropy. We are not concerned to establish these laws. We make use of them as data from natural science, such as the law of inertia, the equality of action and reaction, among others.[31]

The discovery of the law of the conservation of energy was long preceded by the discovery of the law of the conservation of matter. Usually the conservation of matter is conceived of like this: All matter is made of atoms, the numbers of which neither increase nor diminish, but which just regroup themselves again and again. However, (even quite apart from metaphysical considerations) it cannot be maintained that this view is a scienfically proved one, for it has hardly been established that if two atoms of hydrogen and one atom of oxygen form a molecule of water then they persist as precisely these three atoms. Rather, it is also conceivable that water depends upon an *inner transformation* of oxygen and hydrogen. In any case, it is certain that the mass of the water produced is equal to the sum of the masses of the hydrogen and oxygen, and that these two elements can be produced again from the water in exactly their previous quantities. Thus the water was at least the equivalent of the elements used to produce it.

390. The principle of the conservation of matter has been joined in more recent times by a second no less universal and important, *the principle of the conservation of energy.*

Energy is whatever can produce an effect. Thus, for example, any motion is energy since it gives the moving body itself ever varying spatial determinations, and produces changes also in a second body if it runs into one.

The activity of natural energy is called *work,* and (since the working of nature cannot be a matter of talent and skill) the amount of work is determined according to the amount of *energy expended.*

If a heavy body is tossed upward, the energy of motion diminishes continually until finally it is nil. The raising of the weight up to this point is work for which the total energy of motion has been expended. If the body weighed 1 pound and if it was raised 1 foot, then the physicists say that the energy expended in motion has accomplished 1 foot-pound of work, and they make use of this foot-pound as a unifying standard in order to compare quantities of work and expenditures of energy with one another.

I believe these few words suffice to make clear to you three concepts of which we shall make use in what follows: energy, work, foot-pounds of work.

391. I just said, the quantity of work corresponds to the quantity of energy expended, and the energy of motion in the body tossed upward is more and more used up while it rises. Isn't this contradicted when the natural scientists speak of an everlasting conservation of energy? By no means; that is, they do not mean to say that each individual energy persists imperishable (the opposite is obvious). They mean rather to say that when one energy perishes another of an equal degree is produced in its place. In just the same way, even though hydrogen and oxygen themselves had to perish in the chemical process of forming water, still it was necessary that the resulting water contain the equivalent of what was lost.

Let us clarify this with a simple example.

Let us imagine that a ball is tossed up perpendicularly in a vacuum. Due to the effect of its weight it would gradually ascend more and more slowly, and once it reached a certain height it would lose the last remainder of its motion. But immediately the ball would begin to fall, during the fall its motion would accelerate, and finally at the bottom it would reach the same velocity as that with which it was tossed up.

And let us assume that the ball is perfectly elastic and falls on a horizontal surface, which is likewise perfectly elastic; then the ball would be sped upwards again a second time and just as forcefully as it was the first time. Thus, when the motion decreased with time and was for a moment entirely annihilated, there was still in the raised position of the ball an equivalent for the energy loss it suffered. So it can happen that the ball goes up again a second time to the same height and then achieves the original velocity yet a third time, and so on infinitely as long as the conditions remain the same. Therefore the degree of energy really maintains itself changelessly, and we just posses it alternately in the form of a motion and in the form of a raised weight.

392. Now let us change the assumption we made in one particular. Let us imagine that the ball and the surface are not perfectly elastic, for after all in reality there are no perfectly elastic masses. Necessarily the process will be a different one. The ball will not be sped back upwards with the same velocity and therefore it will not reach the same height, and finally it will come utterly to rest. For this reason it might seem at first glance that the energy of motion is gradually lost and not replaced at all. But if the ball and the surface are more closely examined they are found to have undergone a further alteration due to the repeated impact which brought the ball to rest. Their temperature has been raised. Thus heat has taken the place of motion. Now heat is also capable of having an effect and in particular (just think of locomotives and steam ships) it is capable of producing motion. Thus we cannot decide whether energy has been lost or not as long as we have not established the ratio of the heat acquired to the energy of the motion lost. An explanation of this is given by a principle which has been proved by the English scientist Joule in a series of experiments. The principle states: When motion is slowed by impact or friction, then for each foot-pound of work that is lost there always results the same precisely determined quantity of heat, and when motion is acquired by means of heat then for each foot-pound of work that is acquired that same quantity of heat is lost. For example, a motion the energy of which suffices to raise one pound 1350 feet high yields, when it is lost through impact or friction, a quantity of heat replacing the motion and this heat is equal to what is required to heat 1 pound of water 1 degree on the centigrade scale. Conversely, by expending the quantity of heat that is required to raise the temperature of 1 pound of water 1 degree centigrade, a pound can be raised 1350 feet. This quantity is called the *mechanical equivalent of heat.* If 1 pound of pure coal is burned then a quantity of heat is acquired which, if our steam engines were able to transform it completely into energy, would be able to raise 100 pounds 4 1/2 miles high. And conversely, by expending such an amount of motion the quantity of heat which would be acquired by burning 1 pound of coal can be produced. More precise calculations are of no importance for us here. It is enough that we see how the energy of a motion that is lost due to impact has, in fact, its precise equivalent in the quantity of heat produced thereby. Here, too, the individual energy is surely destroyed, but the quantity of available energy remains unchanged before and after.

Also, in respect of all the other known physical processes, and likewise in respect of the chemical processes the scientists have carried out similar investigations, and each time they came to an analogous result. So today no natural scientist doubts anymore that the whole of nature, just as it has a supply of matter, has also a supply of potential energy which never increases nor diminishes.

Thus the quantity of energy is unchanging. There is, in addition to the principle of the conservation of matter, a second principle, that of the conservation of energy.

393. The *quantity* of energy available is preserved, the *form* in which it exists undergoes change. One might ask: Can it happen that, at least after a long period of time, the old form, too, in which the energy had existed, returns?

Let us re-imagine, in order to make the question clearer to ourselves, the ball we left bouncing up and down on the surface. We assumed first that the ball and the surface were perfectly elastic; then we assumed that they were not. Both times the amount of energy maintained itself. But only in the first case did we see the energy periodically return to its earlier form. The ball gained and lost its first velocity again, and rose again and again to the same height. On the other hand, in the second case the energy of motion was resolved more and more into a quantity of heat never again to resume its first form.

It will be like this everywhere if we regard systems on a smaller scale. There is no perpetual motion, no eternally moved thing, among them.

Only with respect to the whole universe can the following question be raised: Is the energy supply of the whole universe also striving against some final state, or will the *universe*, at least, be a *perpetuum mobile* and, after some unforeseeably long period of time, will the relations among things return to a situation which was actual already once before?

394. It is a very interesting question. It was raised already at the beginning of philosophy. And the very oldest philosophers--Thales, Anaximander, Anaximenes, Heraclitus, Empedocles--agreed in the affirmative. "Zeus builds the world," says Heraclitus, "like a child playing, and then destroys it with fire. Such games does Zeus play." Everything is renewed as it was before. "The ocean," he says in another fragment, "will be filled up and measured out according to the same amount as there was before it became land," and, "Each new sun is measured according to the old." People also tell of a few enterprising students, who had more humor in their heads than money in their pockets and, adhering to this doctrine, tried to give it practical application. They presented the theory to a tightfisted innkeeper who demanded too insistently that they pay their bill. After so many thousand years, they explained to him, when everything returns they, too, would come back to

him. So he might as well let them go now. At their return, then, they would honorably settle the account to the last cent. It seems that they spoke rather convincingly. At least it is said that the innkeeper accepted the theory. Yes, yes, he thought, that seems quite plausible. In that case he would gladly allow them to defer payment. But wouldn't they please pay him now what they still owe him, what they promised to pay him before the last period of many thousand years? So it seems, judging from this case at least, that the practical value of the doctrine is not great.

Nevertheless, it is interesting to know whether it is at least theoretically correct.

395. The law which instructs us on this point, and which we here call the law of entropy, was discovered by a French natural scientist, Carnot. And then it was corrected somewhat and thus brought into harmony with the law of the conservation of energy by Clausius. The law is (in the formulation of Helmholtz) as follows: "Only when heat is transferred from a warmer body to a cooler one can it be transformed into another effective type, be it mechanical, electrical, or chemical energy, and even then only partially." Thus, for example, in our steam engines we transform a part of the heat of the glowing coal into mechanical energy when we let it be transferred to the less warm water of the boiler.

396. On the basis of this, the Englishman William Thomson [Lord Kelvin] drew some remarkable conclusions. If all the bodies in the universe were at one and the same temperature then, he concluded, it would be impossible for any part of their heat to be transformed into another type of energy. And he inferred further that because of this we may divide the entire energy supply of the universe into two parts. The one part is heat and must remain heat, and only the other part--including a part of the heat of the warmer bodies and the whole supply of chemical, mechanical, electrical and magnetic energy--is transformable energy. Now it is a well known fact, however, that temperature continually seeks to be equalized and furthermore, that in any mechanical process resulting from impact or friction and likewise, as a rule, in chemical and electrical processes, a part of this energy passes over into heat. Thus it follows that the first part of the energy supply continually increases, and the second part decreases, such that if the universe were left undisturbed in the course of its physical processes, finally the entire energy supply would pass over into heat, and at that, into an unalterable heat.

Then every possibility of a further alteration is exhausted, and there must occur a complete stagnation of all natural processes. All organic life naturally comes to an end. But the planets will no longer revolve about the sun, and the suns will no longer revolve about each other or about a common center of gravity. Only if the stars moved without any friction could their movement endure for eternity. But this is not the case, because first of all they do not move in an absolutely empty space, and secondly they sustain frictions because they are not solid bodies throughout. At every ebb and flow, more energy is transformed into heat; and such heat is demonstrably drawn from the movements of the stars by which these phenomena are produced. Thus the totality of mechanical energy decreases, until it will have transformed itself into an unalterable quantity of heat uniformly distributed among all bodies.

This quantity of heat will naturally be a determinate amount, a certain degree. And according to the law of the preservation of energy, this degree of heat is equivalent to the amount of certain mechanical and other types of transformable energies which, if they existed instead of heat, would necessarily turn back into heat again after a determinate finite, though immensely long time.

397. But if this is true, then obviously we can reason in the other direction, and going backwards from the end point infer a starting point of motion. If there was motion in the universe before a certain period of time, that is, before the period within which the entire supply of energy in the world would have had to have transformed itself into unalterable heat even under the most unfavorable original disposition of the energies, then either the process of transformation would have to have been completed sooner, or else the quantity of heat left at the end would have to be greater. *Therefore motion has a beginning.*

398. Objections have been raised against this: I. Not everything has to become heat. Some motion remains after the fluid parts of the heavenly bodies have gradually become solid and after ebb and flow have ceased as a result. Therefore there is no end point and the inference from it to a corresponding starting point loses its support.

But the solution is not difficult.

1. It is false that motion will have no end on account of the gradual solidification of masses. Only one reason for the continued decrease of motion would be removed thereby; the other, the ether, would remain. It must necessarily be displaced, movement must be imparted to it, an effect. According to the law of the equality of action and reaction, therefore, some of the star's motion must be lost. And in this mechanical process, as in any other, some mechanical energy is lost through impact and friction and transformed into heat.

2. Assuming it were true that after a certain point no more motion undergoes the transformation into heat, even then there would still be a point somewhere at which no transformable energy exists but rather only a dual, unalterable energy supply--mechanical energy on the one hand, and heat on the other. The former is there from the beginning, the latter

has gradually accumulated at the expense of the supply of transformable energy. We can carry out our calculation for the latter and its longest period of formation quite apart from the former, therefore, and say with certainty that before a definite point in time none of this alterable energy supply can have been available, for otherwise the process of transformation would have begun earlier and ended earlier as a result.

3. But there is more. If the transformation of motion into heat really becomes less and less until finally it stops, because bodies gradually become solid, then it hardly follows that a beginning of motion can no longer be inferred; on the contrary it follows that this inference is all the more obvious. For just as from now on, the further we go forward into the future the weaker the decrease of motion becomes, so the further we look back into the past the stronger it must be. Thus the equivalent in motion of the heat which exists now took less time to be transformed than it would have if it had transformed itself into heat at the present rate.

399. II. Nevertheless, another attempt is frequently made to reject the inference to universal stagnation. When I speak of the consequences of Carnot's law, it often happens that someone immediately objects that I seem to forget that the universe is unbounded and that as a result the mass of its bodies and its supply of energy as well are infinite. Even if heat is continually accumulating at the expense of other natural forces, the process of transformation will never come to an end on that account, and the universal stagnation, even if the entire development tends in that direction, will forever remain infinitely distant.

400. This reply sounds quite plausible. One might almost be amazed at the natural scientists for overlooking such an obvious idea which would negate all their prophecies. But anyone who considers the objection more carefully immediately runs up against the great difficulty raised for it by the law of gravitation. Wundt rightly says that a universe which was infinite in mass and space would not have a center of gravity anywhere since gravitation sets up a relation between each body and every other body. But the fundamental laws of mechanics require a center of gravity for every system of moving masses. Thus it seems absolutely impossible to conceive of the material world as infinite in mass and space.

401. So the inferences based on Carnot's law are not that easily escaped.

III. Wundt attempted to escape them by means of a complicated hypothesis, in that he presented two ways out but did not definitely decide in favor of either one.

1. He says that, although contemporary physics commonly teaches the opposite, one could assume that the effect of gravity requires a certain amount of time to get from one place to another, as light or heat does. And in this case the common center of gravity for the movements of the bodies in the universe could be dispensed with.

2. But if one does not wish to decide upon this way of avoiding the received views on gravitation, it remains possible to assume that the universe is indeed unbounded in its extension but is finite in mass. If the supply of energy also appears not to be infinite, then, still the infinity of space would suffice to make it impossible for there ever to be a perfect thermal equilibrium between the more distant places so that the end of the world as predicted by Thomson would never occur. On this view, finite masses accumulated more densely in one place could really have a center of gravity.

We shall give each of these two hypotheses brief consideration.

402. So, to begin with the first, according to this hypothesis gravitation is supposed to require a certain period of time for its propagation such that the universe can dispense with a unified center of gravity as a result. And why should this be so? Because, Wundt believes, in this case the effect of one body need not extend to all the others. To be sure, time has no beginning, but the infinity of the past would be compensated for by the infinity of spatial extension. So the movements of masses could occur even without an ultimate center of gravity of the universe.

This hypothesis, I believe, is easy to understand. But it is nearly as easy to refute. How? If gravity is propagated over time, is the effect of gravity not supposed to have extended from one point to another in space despite the infinity of a past that has no beginning?--Obviously this would be to say, not just that infinite space offsets time with no beginning, but that a distance between two points, that is, a distance that has a beginning and an end, offsets time with no beginning, indeed, outweighs it. But that is palpably absurd. And so this first hypothesis of Wundt's is internally contradictory and absolutely impossible.

403. Let us see whether the second way of escape proposed by Wundt is more workable. He assumes here that the universe is unbounded and infinite in extension, but finite in mass, such that a finite mass fills a space infinite on all sides. But how? A finite mass is supposed to fill an infinite space? Even at first hearing the contention sounds paradoxical. Yet Wundt attempts to ward off the charge of absurdity by a mathematical demonstration.

Mathematics recognizes progressive series in which the sum of the members never exceeds a definite, finite quantity even if the series is imagined to proceed infinitely. The series, 1/2 + 1/4 + 1/8 + 1/16, etc., in which each succeeding member amounts to half the preceding one, never results in a sum greater than 1, even if it proceeds to infinity. In a similar way, Wundt believes, it would be possible also for a finite mass rarefied in all directions infinitely from a determinate midpoint to fill an infinite space unbounded on all sides. Indeed, it would do this in such a way that at each determinate point it would keep a certain, finite density and at no point would it have become infinitely rarefied. (Which surely can't be assumed to happen without absurdity, and would mean the annihilation of matter itself.) And so Wundt believed he had proved his hypothesis to be acceptable despite the reservations of so-called common sense.

404. Nevertheless, this attempt to escape the implications of Carnot's law is utterly impossible. Aside from everything contrived and complicated which makes this hypothesis improbable *a priori* , and further aside from the difficulties it must fall into with respect to atomic theory, that is, despite everything Wundt says, the contention remains absurd that a finite mass occupies an infinite space. In his mathematical explanation he makes use of the concept of infinity otherwise than as mathematics allows, and the calculation therefore becomes a sophistical trap. That it is in fact not merely paradoxical but absolutely contradictory to imagine an infinite space to be filled by a finite mass in the manner of the distribution required by Wundt might be made clear by the following simple consideration. If one wishes to distribute a small store of provisions among a group so that everyone receives something worth mentioning, how will one best achieve this?--Obviously by distributing it equally. If one person is given more than the average share, then this plus on the one hand must necessarily be compensated for on the other by a minus.

Let us apply what has been said to the distribution of a finite mass in an infinite space. That distribution which still would give the best hope of imparting to each part of the space a matter of definite, finite density would obviously be equal distribution. In any unequal distribution the plus in one place would have to be compensated for by a minus in another. But the equal distribution of a finite mass in an infinite space is admittedly impossible, since the matter would have to be infinitely rarefied overall, i.e., its density would not exceed zero by even the smallest of quantities. Therefore it is actually impossible to imagine an infinite space to be perfectly filled by a finite mass.

Thus Wundt's second attempt also includes a contradictory assumption. But it was in fact the last attempt that can be made here.

405. After that nothing remains except to concede to Thomson, Helmholtz and the other great natural scientists that they have rightly inferred, on the basis of Carnot's law, that the energies of the universe left

to themselves will at some point be completely resolved into equally distributed heat and that the universal stagnation is inevitable.

The prospect for the future, which the most recent investigations of natural science thereby open up, seems not to be a very cheerful one. Nature, with all her processes, if left to herself, comes within a finite time to an eternal death.

Let us once again turn our attention from the future to the past. Perhaps the laws of physics, which showed us what threatens nature if she is left entirely to herself, show us here that we need not assume that she will be left to herself.

In fact, if our inference to the final state was necessary, then our other important conclusion was inevitable, too. The development of the world, in as much as it leads to an end, must also once have had a beginning.

Let us imagine that the entire energy supply of the universe (which has now to a significant degree approached its final state, the complete transformation into heat) exists in a form at the furthest possible remove from that final state, such that not even the smallest part of it is heat yet. If the overall temperature of matter were what the theory of thermodynamics designates as the lowest limit of cold, 270° below zero, what would happen?--Immediately the process of *entropy*, as it has been called, would begin and in gradual progression lead to the condition of the total resolution of energy into equally distributed heat.

The period of time necessary for this would be very long in comparison with our lifetime or even with the life of the whole human race, but nevertheless it would be a bounded period. We can designate it algebraically as a period of *n* years. It is obvious, because we are already closer to the final state, that from now on it will take fewer than *n* years for the world left to itself to perish completely. It is just as obvious that *n* years ago the development of the world could not have begun yet. For otherwise it would have ended already by now.

But the development of the world began as soon as there were potentially effective energies actually available in the world, and these must have immediately entered into interaction with one another. So this agrees with our conclusion, which is of such great importance to metaphysics, that *n* years ago, that is, before a finite period of time the energy supply to be found in the world actually did not exist.

406. It was in the Winter semester of 1868-69, when I was an instructor at Würzburg, that I presented this inference from the Carnot-Clausius law in an academic lecture. About the same time, or just a few days later, it happened that at the same university the physiologist Fick, at the close of a series of lectures on the interaction of natural forces, came to the same result independently of me. And shortly thereafter when I went to England, it appeared that there the famous physicist, Tait, had

drawn the same conclusion, a sure sign of how obvious it is and of how perfectly inevitably it forces itself upon us.

So it may be said that today it has become common knowledge that, if the end of the development of the universe can no longer be denied, neither can its beginning. As an authority on this point, listen to what Wundt himself declares: "Clausius," he says, "arrived at the principle that, 'the entropy in the universe tends toward a maximum,' which, together with the principle that, 'the energy in the universe is constant,' necessarily includes the idea that the development of the whole universe takes place between a starting point and an end point which are at a finite temporal distance from one another." Even Wundt says this. His witness here is all the more important because it is the witness of a man who, on account of certain metaphysical prejudices, resists with all his might the admission that the universe had a beginning. This is precisely what drove him, as we saw, to the desperate hypotheses by means of which he wishes also to escape the assumption that the universe will end.

407. Thus the development of the universe had a beginning just as surely as it will have an end, and at one time the energy supply of the universe did not exist at all. If we now ask whence nature has since acquired the energy which it once did not possess, there is only *one* answer to that:

It certainly did not get it from itself. For according to the law of the conservation of energy, nature left to itself can no more gain than lose the smallest part of energy. So we are absolutely forced to assume that the quantity of energy the universe has at its disposal, with which it erected the starry vault and wove the delicate figures of plant and animal life and all the charm of human loveliness, only to undo the intricate threads afterwards and rend asunder the stones of the edifice--this energy was lent to the universe a finite period of time ago by an ultramundane principle. Its activity is the Alpha and Omega of the whole history of the universe.

That is the metaphysical conclusion necessitated by the most recent discoveries of natural science. And anyone who investigates without prejudice, who doesn't wish to determine the outcome *a priori* (for this can only be known as the reward for taking the pains to make an investigation), will also draw this conclusion, like the earlier ones,without any reservations.

408. There is no way to escape the inferences based on Carnot' s law, except on the pretext that perhaps it will still be proved incorrect, a claim that cannot yet be completely refuted, of course. For Carnot's law does not have that degree of certainty which attaches to the best proved laws of physics, such as the law of inertia. Yet there are few natural scientists who harbor doubts with respect to it, especially since several remarkable

facts, which were predicted on the basis of it, have been confirmed later by experiments.

But however that may be, our proof is still afflicted by a certain flaw until Carnot's law is completely verified.

2. *Proof of the prime mover on the basis of a contradiction in the concept of a motion without a beginning.*

409. The possibility of yet a further simplification and abstraction of the results from natural science must be all the more welcome to us. This possibility does in fact exist, such that the proof that motion in nature has a beginning approaches the character of a mathematical proof, in that it argues *a priori* from the concept of a motion without a beginning.

For the sake of clarity and vividness we shall begin by considering the simple, special case of a steady motion in a straight line.

So we say, it is absolutely impossible to conceive of a body as moving steadily in a straight line without having begun to do so. And this for the reason that a body, which was conceived to be moving thus without beginning to, would at no moment have arrived at a definite terminus, a definite point on the line. Thus, for example, it would now be neither at point A nor at point B nor at any other definite point on the line. Otherwise there would have to be a reason why the body is here rather than there, or at any of countless other points on the line, but such a reason is entirely lacking.

A brief explanation will make this clear.

For a finite motion, the conditions determining where a body proceeding steadily in a straight line is now to be found are the following four: Direction, velocity, time, starting point of motion. For motion without a beginning, on the other hand, the fourth factor is displaced by the beginninglessness of its path. But this beginninglessness holds as well for the first as for the last place occupied by the moving body, however far removed they are from one another. And if a series of bodies are moving one after another, this is likewise true for the first and for the last of them. Each has traversed the same path in the same direction, in the same time, with the same speed; so why is one of them here, another there?

410. This impossibility may be shown even more clearly in another way. Let a body be conceived--following the contention of our opponent--to be moving steadily in a straight line without having begun to do so. Obviously it is moving with a determinite velocity c, is now to be found at a determinate point N, after having traversed a beginningless line. Let us imagine that under otherwise identical determinations it moved half as fast, with velocity $c/2$. In that case, too, it would be found at a determinate place. But would it be the same place? No, even if it were only in the last

hour that it had reduced its velocity by half, then at the same point in time, now, it could not have arrived at the same place.

In the same time in which it would have reached point M at half velocity, it has now reached point N at full velocity *c*. Now since in the same time twice the distance is covered at twice the velocity, the segment MN is equivalent to half the distance traversed by the body travelling at full velocity, thus it would be half the entire distance to N, i.e., the beginningless line to M = MN.

Therefore there would be a line between two points which is as long as an infinite line, and a straight line having a beginning and an end would be equal to a beginningless line, which is contradictory.

But from possible assumptions nothing absurd can follow; *ergo* the assumption of a beginningless motion was absurd.

411. I have discussed this argument frequently, even with mathematicians. Many found it convincing,only the mathematicians tended to have one misgiving at first: A beginningless line, etc., cannot be assumed, and when they calculate with infinity something quite different is meant. To this I was able to reply: It is not I but my opponent who makes the assumption of a beginningless motion, since I seek rather to show the impossibility of it. When this was clear to them, they followed the argument without difficulty.

412. Generalization. Instead of the beginningless motion considered above, let there be given any randomly chosen beginningless sequence of transformations, with or without interruption. Some state of affairs (Sz) is reached at the present. Let us imagine now that all parts of the transformation had occurred twice as slowly, or that the pauses had lasted twice as long; would it already have achieved by now the same state of affairs? No, it would be at another one (Sy), which is presently achieved at an earlier point in time. In how much less time? In half as much. Thus the time in which the state of affairs Sz is reached is equal to the time elapsed since that point in time (the reaching of the state of affairs Sy). Thus a beginningless time is equal to a time that has a beginning and an end. In truth, however, the relation obtaining between a beginningless time and a time which has a beginning and an end is the same as that between a beginningless line and one which has a beginning and an end. Thus the beginningless time must be infinitely longer. Thus the infinitely greater is taken to be equal to the infinitely smaller, which is contradictory.

So the assumption of a beginningless sequence of transformations contains an absurdity.

413. This argument is applicable to all motions and alterations, be they uninterrupted or interrupted, but it is not applicable to time since

there is no distinction of velocity conceivable for this. Therefore there was once a moment before which no kind of alteration existed, except perhaps the steady change of time.

Before that moment either there were no alterable things, or at least they were at beginningless, absolute rest. In both cases, the law of causation demands an active principle, in the first case a creative one, in the second a first mover which is not itself in turn moved by another one.

414. In both cases the active power must be thought of as one acting consciously, since there is no conceivable reason why a power acting blindly should not have acted without beginning to.[32]

415. Of course, according to the law of causation it is true of any power, of a conscious one as well, that it begins to act at the moment when none of the conditions required for that are missing. But for the first principle, if we conceive of it as thinking, it is possible to think of an explanation for the beginning of its activity at a definite time. That is, one may assume that it thinks without beginning to, and that by an eternal decision it has preferred a definite point in infinite time as the one best suited for the beginning of its activity.

416. Naturally, one must not think of the points in time as being perfectly equal--which sounds strange, but is self-evident since there are many of them and therefore they must be different from each other. (Similarly in the case of places, the strangeness is due to our being accustomed always to dealing in intuition only with relative places and times, while the absolute remain transcendent for us.)

417. Further, one need not think of the first principle as being absolutely changeless, the way the founder of the proof from motion, Aristotle, did. For if it were changelessly persistent in the idea of making a future moment the beginning of its activity, then even at the instant when this becomes the present there would be nothing about the first principle to distinguish it from the way it had been forever before that. In other words, it would not have recognized at all that the moment which it had forever awaited as a future one had now arrived, and it would have continued to expect it as a future moment. If its work were just as well begun at the present moment, then there would be no explanation for it, and we'd be no better off than if we intended to explain this beginning on the basis of an unconscious principle.

We cannot help assuming, therefore, that it previously recognized that point in time as a future moment, but successively recognized it as one which came closer and closer to the present and then recognized it as being present now.

418. Then the commencement of its activity at a definite point in time presents no difficulty for us; but perhaps to many the proof from motion seems all the more to have failed of its objective. This proof did intend to show for any transformation that it must have had a beginning, and on the basis of this it inferred the existence of a beginningless, moving principle. If, however, as is now pointed out, this principle also cannot be thought of as changeless, then it must likewise have had a beginning, and so there results the necessity of seeking an active principle for it, and so on to infinity.

This misgiving would suggest itself mainly to those who, under the influence of Aristotle, take the proof of the prime mover to be the proof of an absolutely changeless mover. But this does not hold true of the proof in the way we have carried it out. We have proceeded, not from the fact of change taken absolutely, but rather from the fact of such alterations as may conceivably change their velocity. This does not hold for the change which we had to concede even in the first mover. For the first mover, change in velocity seems rather to be out of the question, as it is for temporal change as such.

419. All further conclusions of the proof rest on the demonstration that the first principle caused motion consciously. That it is a creative principle follows analogously to the way it does in the teleological proof. It could not have set matter in motion without possessing knowledge of it, but could not have this knowledge apart from a causal connection with matter. But it is not that matter affects the first principle, which must rather be thought of as impassible;[33] so it is the other way around, that the first principle caused matter, i.e., creatively produced it.

THE PROOF FROM CONTINGENCY

420. The proof from contingency[34] is even simpler than the proof from motion, but it is less useful for convincing many people, and that is for the reason given already, because the concepts are so abstract that one does not quite trust oneself on account of the ease of deception by equivocation.

What are the premisses upon which the proof rests?

421. One universal law, and one fact.

I. The fact is this, that there are things in the world the existence of which is not directly necessary, but which could rather just as well not be. And this is so, not merely in the sense that, for example, hydrogen and oxygen if they are transformed into water no longer persist in reality, but also in the sense that they need not be virtually included among material things. Thus, for example, if a drop of water that exists now did not exist and nothing else existed in its place but only those things which now have existence in addition to it.

That is the contingency which forms the experiential basis of the proof and which gives it its name.

422. One finds people inclined to concede such contingency without further ado for many things which fall in the sphere of our experience. Therefore one usually omits to produce an explicit demonstration of it. (One finds it more difficult to assume a being, like God, which is not contingent, than one which is contingent, because in fact all the objects of experience are taken to be contingent.) But if our argument is really supposed to be valid, we may not spare ourselves the inquiry in order to gain a clear and complete insight into this fact.

423. There easily emerge reasons above all for the contingency of *bodies*.

Their contingency is quite a clear inference just from the fact that there exist a multiplicity of individuals in one and the same species; at least I believe that hardly anyone who looks at this fact from our point of view would still entertain the slightest doubt about that.

Not even the corruptibility of certain substances, which has likewise been pointed to as a sign of their contingency, can compare with the significance of the above mentioned fact. And in particular it has the advantage that even the atomists, who resist the assumption of any corruption of substances, readily admit it. There are indeed countlessly many examples of the same kind, e.g., of the oxygen kind, such that each individual example of the species has precisely the same characteristics as the others.

Obviously one of these characteristics is that the existence of one individual does not rule out the existence of another of the same kind and with the same characteristics, since in fact there are millions and trillions. Now who would maintain that in this respect there is a limit, say, that something does not rule out the existence of nine hundred ninety-nine individuals like it, but it does rule out the existence of 1000? Rather, it is obvious that if a multiplicity of individuals is actually conceivable in a species, no determinite quantity exceeding that could amount to an unsurpassable limit. If there were twice as many, there would be nothing more impossible about that than there is now about the fact that there are half as many.

But if this is rationally not to be denied, then it becomes evident that the individuals of this species are one and all contingent, and thus we get the experiential basis for our proof.

424. Just as there cannot be an infinite number of bodies at any time, so there cannot be an infinitely large body either. An actually infinite extension is contradictory, too. Therefore the continuum of places, insofar as it is actualized at a single moment, also cannot be thought to be infinitely large. The doctrine that there is an infinitely large space is absurd. This holds for filled space, whether it is wholly or partially occupied by bodies.

Thus places, too, are such that they can just as well be actualized as not be actualized. In other words, each place is something contingent. Now since no body can be without having a place, the contingency of bodies follows from this standpoint as surely as the following principle holds true: If something cannot be without something else which is contingent, then it must itself be contingent. Rest and motion are also contingent, just as place is, and again, a body cannot be conceived without one or the other. We see bodies leave one place and take another, and pass from rest to motion, from motion to rest, and from one determinate velocity to another. So there is no doubt that no body is directly necessary.

425. The two arguments may also be united. What is the principle of individuation and numerical difference for bodies? Place; and since this is contingent, so are bodies.

426. The heart of the argument, with which we have demonstrated the contingency of everything in three-dimensional space, was the insight that there are always infinitely many more places possible than actualized and filled. It rests on the distinction between the infinity of possible spatial things, and the finitude of spatial things actualized at a given time. Therefore this proof can be carried out with equal validity for a world with any number of dimensions. For it does not depend upon the specific number three; rather it would be equally applicable, if we lived

not in this space but in a topoid of four, five, or *n* dimensions, to the stereoids (analogues of bodies) which experience would present in that case.

427. Of course, in order to have such command of the proof that all objections can be met, one must have some familiarity with the basic doctrines of megathology (general theory of largeness) and synechology (theory of continua). One will then easily recognize that the concept of a "curved space" (or curved topoid of some number of dimensions other than what our space has) is absurd. But today this concept obsesses the minds of many natural scientists, and has induced them to call into question the most reliable principles, and in particular even the finitude of space.

In truth, the idea that space is not straight but curved is just as preposterous as the idea of a curved time. If space is to be space, and if time is to be time, then all their parts must be homogeneous, i.e., all the directions that coincide in one point must be found in that (inner) part of the continuum.

A motion can go in a curve, so can a boundary (line or plane), but not a space or a time which form no boundary of a multidimensional continuum. Motion is not, like space and time, a primary continuum, but rather secondarily continuous (spatio-temporal). Anything spatial thus appears to maintain itself in imperfect teleiosis,[35] but a three-dimensional thing in non-curved space is temporally bounded by another thing in non-curved space, and so here, too, what is in continuity displays all the same directions.

It is precisely because of this homogeneity of space that one part of space agrees just as well as any other with the nature of body, and thus that instead of the bodies actualized at a given time any number of others are conceivable without absurdity. So no body is directly necessary.

428. It is also easily demonstrable that our mental life is not directly necessary. In every conclusion we notice that it is produced by the thought of its premisses, in every choice that it is effected by its motives. Also, every mental act, such as our seeing, hearing, smelling, tasting, feeling, is maintained not by analogy to the law of inertia but only by a continually renewed causation. And as regards the subject of these faculties, some take it to be physical, and in that case the proof that it lacks direct necessity has already been carried out by us. And if others think it is non-physical, then they still must concede that given the indefinite multiplication of the physical conditions of its appearance, it could itself also be conceived to be indefinitely multiplied. But since an actually infinite multiplicity is just as impossible in the spiritual realm as it is in the physical, it appears that here, too, direct necessity must be denied.

429. But how are we to think of that which lacks direct necessity? Only two assumptions turn out to be possible. Either it goes without any necessity, even the indirect necessity it would have if it were caused by something necessary; then it is to be called absolutely accidental. Or else it is contingent merely in the sense that it can be only if it is caused by something else.

In order to decide between these two, we must inquire whether an absolutely accidental thing is actually possible.

II. With this we come to the discussion of the general principle concerning which we said above that it also forms one premiss of our proof.

430. *The impossibility of an absolutely accidental thing* is a result based on the following considerations.

Everything that is is present, just as everything that was was present, and everything that will be will be present.

Also, everything that is is at the same time as everything else that is; and there is only this one difference, that among those things that are present, one is the beginning, another the end of a process, while a third presents itself as the inner boundary of a process, joining that which already preceded it with that which will proceed from it. In each case, even where one speaks of an unchanged persistence, it is clear that one has to do with a continuous, temporal change without which the distinction between shorter and longer periods of time would make no sense.

431. In what has been said we have recognized that not everything that is must belong to a temporally continuous process which extends both into the past and into the future. However, one or the other connection cannot be missing. It is impossible for something to begin and end abruptly in the same instant. It is conceivable, perhaps, only that a thing which now begins abruptly will end abruptly at a later moment, or that a thing which now ends abruptly began abruptly at an earlier moment. We always find an interval which, however small it is imagined to be, is a continuum of indefinitely many distinct moments which have been or will be the instants of merely infinitesimal change.

432. The question now is whether such a merely infinitesimal change can be conceived of without contradiction, *if it is* supposed to be given as *something absolutely accidental.* And we must answer this question most decisively in the negative. For, on the one hand, in the case of the absolutely accidental, an abrupt change must be just as probable as continued persistence, if not even more probable, at each instant considered by itself. On the other hand, according to what has been said, the cases of continued persistence must still be infinitely many more than the cases of abrupt change, since between every two cases of abrupt

change there must always be countless cases of continued persistence, which is contradictory.

433. So the proof is completed that nothing which is can be absolutely accidental. Now since we have demonstrated concerning the things of experience, the bodies and souls, that they also cannot be taken to be directly necessary, it follows that they are indirectly necessary.

But if this is so, then without a doubt there must be something else which is directly necessary, and which must be regarded as the first, creative cause of all that falls within our experience.

434. Perhaps someone believes this conclusion is untenable, since on the contrary it would be sufficient if the indirectly necessary in our experience were made necessary by something which is itself only indirectly necessary. Naturally this in turn will have something else as its precondition, but perhaps that could also be just indirectly necessary, and so on to infinity.

But this is clearly to refute oneself; for in such a situation the whole series of things which are called indirectly necessary must appear to be accidental, and everything we have said against the possibility of the absolutely accidental would remain in force. (Consider, for example, a succession of bodies each of which produces the next. If such a succession could occur anywhere, then it could also occur in the same way at any other point in space, but not at all of them, and so every succession would appear to be accidental.)

435. We come to the fourth proof for the existence of a creator. It is the one we have called "psychological," however it must not be confused with the one which Descartes thus designated and which we have earlier shown to be mistaken.

It is based on the fact that the subject of our conscious states is not the body or a part of it, but rather an unextended substance. Since the materialists contradict this view, and since on the other hand those who teach the incorporeality of the soul do not agree in the arguments they give, let me here present briefly the reasons which seem decisive to me.[36]

436. Many have incorrectly wished to infer the incorporeality of the soul from the fact that we grasp our conscious states by evident, inner perception and not as things which have places and are extended.

The inference would be valid if we could be certain that inner perception shows us our selves in complete determinacy. For its being evident to us does imply that everything which it shows us really is there, but does not also imply that it does not withhold from us any features of what it shows.

In fact, it is easy to see that inner perception lacks completeness, and full determinacy.

Above all, it lacks individual determinacy. That is, it shows us nothing which could not also occur at the same time in another subject. None of the psychological activities that we experience in ourselves is so constituted that there could not be countless other subjects practicing it in the same way. But according to the fundamental principle of the identity of indiscernibles, two things cannot be the same as each other in every respect. At least they must have individual differences, even though they do agree in all other respects.

This individual difference, that which constitutes our I in the strictest sense, is not shown to us by inner perception, it remains transcendent for us. We can only say that it cannot lie in the types of activities since these may be the same for many individuals, but rather it must be an inner difference of the subject.

This is similar to the objects of outer perception. Countlessly many can have the same quality, but only one can ever be in the same place. So here it is place which constitutes individuality. But we do not know what place is *in individuo*. Absolute spatial determinations do not fall within our intuition, only relative ones do. We do not see where a visual object is, but rather only how far and in what direction it is removed from another.

Nevertheless, this suffices to enable us to acquire the concept of the spatial in general. Though we do not understand how a physical subject differs from every other physical subject *in individuo*--that would be absolute place--still we do know what a physical subject is in general.

On the other hand, they err who believe that in inner perception we grasp ourselves as unextended substances. The indeterminacy is even greater here than it is in outer perception. Each one perceives itself only as a subject which has certain conscious states, without being directly aware of the individual determinancy, or even the appropriate species determinacy of this subject.

As a result, although we do not perceive ourselves as corporeal, it appears that corporeality is not immediately ruled out.*

437. The hypothesis of corporeality does suggest itself as the most obvious, since outer perception, even though it also withholds the individual differences of things (e.g., visual objects) from us, still shows them to us as *corporeal substances.* Where we see substance not in its greatest indeterminacy, not *merely* as substance, we see it as extended substance.

438. So it follows that it is necessary to study carefully what inner perception shows us, and to compare it with what seems to us to be most reliably established about the corporeal, and on the basis of this to decide whether the assumption of the corporeality of the soul is in any way tenable. If it were tenable, then it would certainly follow directly that it is the most probable assumption of all.

439. What is certain for us with regard to the nature of the corporeal? Despite the great achievements which are credited to natural science, almost nothing. On nearly all important points dissension reigns, and at the present time even more than before.

We said already that we lack the idea of that by which one absolute place is distinguished from another. But we also have no idea of the qualities that fill the real places. We possess no idea of their specific, nor even just of their generic differences. In this respect psychology is far superior to natural science. Out of inner experience it draws a great wealth of concepts, not only such as the general concept of consciousness, but also less general ones such as those of presentation, of judgment, of taking an interest, and still more specialized concepts such as those of accepting, rejecting, blind and evident judgment, of love and hate and preference, etc.

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* If what we grasp by inner perception were clear as to its individual difference, then nothing would be easier than to decide the question of whether it is corporeal, and the decision would turn out to be negative. For in this case our conscious states must appear localized to us, just as surely as place is the individualizing factor of the corporeal, indeed they must exhibit the most rapid change with respect to this localization, just as surely as we would make such a change along with the moving earth. -- There is a connection between the fact that one is misled by the lack of individual determinancy in what is perceived by inner perception, and the fact that many imagine the proof of incorporeality to be something quite easy. Thus Cicero, when he pointed out that no judgment is round or triangular. And perhaps also Pascal, when he asks: "What thinks in us, the thumb or some other part? -- One sees that it must be something incorporeal." Nevertheless, the same Pascal recognizes very well in another place, and emphasizes it forcefully, that we can identify nothing by which one human soul is individually distinguished from the others.

440. That the nature of the physical world poses a problem for the human spirit came only recently to its consciousness, because originally, led by a natural instinct, it took on blind faith everything that outer experience shows as being real. However, with time it found itself led into contradictions thereby, and today the naive world view of primitive humanity has finally been refuted.

441. There followed a theory according to which everything corporeal was supposed to exhibit differences only of place, extension, figure, rest and motion, and all physical processes proceeded purely mechanically. Laws of impenetrability, inertia, equality of action and reaction, composition of forces were supposed to govern everything physical.

442. On such a view the incorporeality of a thinking thing would be easy to show, for inner perception shows us with evidence something which is in any event not to be resolved into differences of a spatial nature. But this extremely mechanistic interpretation also proved more and more to be untenable;and then a so-called "*Alsobism*"* took its place. Some individuals carried it so far that they didn't even want to let it be said that a physical, external world actually exists, but rather only that appearances proceed as if it did exist. Still others doubted spatial continuity. But the great majority recognize that the existence of a physical, external world is made infinitely probable by experience and that continuity in space and time is also sufficiently assured. Everything we believe to be established concerning natural law would collapse and have to be replaced by the most complicated, and therefore most improbable hypotheses.

443. However, setting these bizarre opinions aside, there remains enough cause for questioning. Above all with respect to the structure of matter. The long-maintained, rigid atomism is abandoned today. It has been recognized that the atoms are not the ultimate units (electrons, atom-smashing).

Another controversy revolves around the ether and its relation to solid bodies. Some conceive of it as a multitude of tiny particles like atoms, others as an unmoved, continuous substance which penetrates the solid bodies and penetrates the electrons and extends to infinity in all directions.

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* *als ob* = as if (Tr.)

But one could also construe the ether as the sole true substance and bodies, including electrons, as its modes which pass over from one part of the substance to another and in turn themselves underlie qualities. Similarly, rays of light and electric currents would also be conceived of as modes which propagate themselves from one part of the ether to another, and the same would hold, too, for other rays which are supposed to explain gravitation. Then the ether itself, which would be a unified, continuous substance, could be thought to be bounded in space instead of infinite, which would prevent the otherwise to be dreaded dissipation of the modes into infinity and therefore the destruction of the universe by disintegration.

444. In the face of such diversity of opinions there threatens to be no foothold for us at all in the inquiry as to whether the soul could be corporeal. Yet there is one thing we can hold on to as being sufficiently assured--that the corporeal is extended in three dimensions, or if it is only a physical boundary, that as such it attaches to a thing extended in three dimensions.

445. Let us look now at the psychical. This is presented to us with direct evidence, as has been said, in so-called inner perception. And here, too, we can speak of the absolute knowledge of specific determinations.

446. If we look more closely, then each person grasps only his own psychical modes. If we believe in a mental life foreign to ourselves, then we infer it by analogy to the modes which we find to be our own.

447. This "our own" requires a special explanation. What we directly perceive of mental activities appears to be very complicated but to belong, despite all the complication, to one real unity. It is undeniably a matter of one thing having many properties. If, when we see and hear, the seeing were the property of one thing and the hearing the property of another, then how could there be a comparison between colors and sounds? (It would be just as impossible as it is for two people, one of whom sees the color and the other of whom hears the sound, etc.) This is the fact of the unity of consciousness. Of all the things involved in consciousness, only the part belonging to consciousness itself could be perceived inwardly and with evidence; all the rest can be perceived only, as it were, as objects of outer perception.

448. Though the unity of the thing, to which everything psychical of which we are aware belongs, is established with certainty, still we said

our knowledge of its being is without any further determination to begin with. Nevertheless, the great thinkers of antiquity wanted to produce reasons why it cannot be thought to be extended in three dimensions or, in general, to be corporeal. The most important argument was Aristotle's. He proceeded from the idea that everything which is the property of a body must be extended in three dimensions just as bodies themselves are. If we think that motion and rest are properties of bodies, then motion and rest must also be extended in three dimensions. And the same holds for color, cold, and other qualities. So each of our psychological functions would have to be extended in three dimensions if they attached to a thing that was a body. Now someone could perhaps say that in fact our seeing admits the distinguishing of continuous parts, for as many parts may be distinguished in the seeing as in the image seen. However there are other functions in which the opposite is the case, for example, when we think the concept, "a thing," "a property," "a relation," "a judgment," and the like. If a body had this function as a property of itself, then it could not distribute it among its parts, nor yet among the parts of one of its parts. Therefore we must assume that the function attaches itself as a whole to one point of the body or, if not, that it attaches itself to its entire continuum or to an extended part of its continuum such that it carries out its function not merely once but in infinite repetition, that is, infinitely many times at once. The former is impossible; but with respect to the latter Aristotle thought it would be absurd to believe in such an infinite multiplication. And so he believed himself fully justified in the conclusion that what carries out those higher, conceptual cognitive functions in us is non-corporeal and in fact unextended, and that it is therefore something spiritual.

449. It is worthwhile adding something here in order to show how Aristotle's whole theory of the human soul developed in a very peculiar way as a result. Aristotle held that it was equally as impossible for an unextended substance to have an extended mode as for an extended substance to have an unextended mode. Now we saw that in seeing the function exhibits a certain continuity, and something similar holds in other areas of sensation. Consequently, Aristotle believed that a physical organ must be thought to be the subject of this part of our mental activity, and that the claim of spirituality for the subject of mental activity should be restricted to the so-called supersensible functions. So his theory of the human soul was, so to speak, semi-materialistic as, by the way, that of Plato was already.

450. But this theory is to be objected to for a number of reasons.

It is true, of course, that a mental function having no parts cannot be distributed piece by piece onto the parts of a body. And, again, it is true that a mental function cannot attach to a single point of the body as long as all the other points do not carry out the same function or one just infinitesimally different from it. However, it is not so obviously absurd as Aristotle believes for this mental function to recur in a continuum by steady repetition point for point, as indeed other properties do, e.g., red, when a whole surface is red.

On the other hand, the contention is also incorrect that no continuous mode may attach to an unextended thing. What holds true here is similar to the issue of unity and plurality. With the plurality of subjects the modes must also be multiplied. However, it is quite possible for a plurality of modes to attach to one single subject; and if there may be a plurality in general, then surely there may also be a continuous plurality (the idea of a period of time at one instant). Therefore much more would be needed to make us accept the view of Aristotle, which is so strange considered by itself.

Rather we shall reject it as decidedly mistaken in certain respects, but in other respects we shall at first remain undecided as to which of two conceivable assumptions we should prefer.

451. The distinction is decidedly to be rejected which Aristotle makes between the sensible and so-called supersensible mental functions when he lets the former attach part for part to different parts of a subject. This would be contrary to the unity of consciousness.[37] Even the theory of the partially spiritual, partially corporeal soul would already be incompatible with the unity of consciousness due to this duality. So that is the doctrine to be rejected decisively.

452. The next point which remains doubtful is that concerning whether what thinks in us is a spirit, or something extended physically to which our whole thinking (seeing, hearing, pleasure, pain, fantasy, conceptual presentation, belief and denial, love and hate, hope and fear, desire and aversion, preference and devaluation, etc., etc.) attaches, as red attaches to a surface over which it is spread equally, or as a violet which passes by infinitesimal variations from one of its boundaries over to the other. In either case we would avoid allowing a boundary to exist in isolation, which would be absolutely incompatible with its nature.

453. Now which of the two assumptions is correct?--Perhaps someone thinks it possible to decide the question simply in favor of spirituality, because under the assumption of corporeality one would speak not merely of one soul but of a multiplicity, indeed of an indefinite multiplicity of souls in the same body. None of them would know anything about the others and so they would have to interfere with each other continually in their control over the body.

However, given their complete uniformity they could be in the same body only if one believed in indeterminism.[38] And one could think that the phenomena of fission in the lower animals make the idea of this very probable at first, at least for them. So we must take the question into still more careful consideration, and in particular with respect to the human soul. And here we will have to make use of investigations in the realm of the physiology of the nervous system, and in particular of the brain.

454. Descartes' prejudice (which Herbart also shared, and to which no doubt even Leibniz gave his assent) was that the soul must be in an organ which exists in the brain just singly and not paired. He decided in favor of the pineal gland, Herbart in favor of the pons; both assumptions have been completely refuted. Flourens believed he had found the seat of the soul to be what he called the *noeud vital*. If it is pierced through, the mightiest bull falls down dead without a quiver. However, this hypothesis, too, has finally been refuted: If, instead of cutting abruptly, one proceeds more slowly, then in rabbits one can excise the so-called life node entirely and still keep the animal alive for days. Also, Flourens himself later demonstrated that the life node is just as much a pair of organs as the cerebrum is, and that either half can be removed without making the continuation of life impossible. Far from supposing that the life node is the seat of thought, people today are generally convinced that if thought actually has a bodily organ for its subject, this could be nothing else but the cerebrum. So we must take a look at the anatomy and physiology of it.

455. Anatomically it is established that two hemispheres may be distinguished in it, which correspond to one another in such a way that neither has more claim than the other to be regarded as the subject of thought. Therefore we would have to declare both to be so equally, which would be as much as to say that when we think the same thought is repeated point by point in its entirety in the one hemisphere and in the other. And quite consistent with this would be the fact that any part of the cerebrum which is not too big may be removed without the continuity with earlier thought being lost in what remains. However, something else gets in the way of this assumption. The complete uniformity of thought and will would require such a uniformity of their subject and its conditions as is not at all conceivable for the two hemispheres. Just consider the differences in degree of heat, or in the case of an electrical impulse, or even in the case of a one-sided pathological degeneration. Thus there is here produced a clear proof against the hypothesis.

456. It is still to be added that, if we regarded the cerebrum as the subject of thought and, as would then be necessary, if we attributed the same cognitive function to it part by part and point by point, we would completely contradict what the materialists among physiologists believe. That is, they believe they have demonstrated specific cognitive functions

to be functions of different parts of the cerebrum; thus, for example, the phenomena of memory, indeed very specialized ones by means of the remarkable phenomena of amnesia. Meynert even wants to make it plausible that each separate idea has a separate neuron in the brain as its subject; occupied with such an idea the neuron is incapable of taking up any other. Nerve fibers which connect them are then supposed to make it possible to predicate one idea of another. Upon counting the neurons, he held that the vast quantity of them settles the point that their number is sufficient for all the ideas that one could ever form in life. All of this is utterly absurd in light of the conclusions based upon the unity of consciousness. And everything which goes to show that the different parts of the brain perform different functions for our thinking therefore results in a fresh proof that their function does not consist in their being themselves the subject of thought, but rather in their being a condition of thought in a different subject. And so it is now really, rigorously proved, as Descartes and others had prematurely assumed, that what thinks in us is not something corporeal, that it must rather be held to be something spiritual.

457. As such then, although itself unextended, it can be thought to be present in an extended thing, like our brain, in such a way as to receive influences, not merely from one point, but from all parts of an extended organ, and likewise to exercise an influence on all parts of the organ, quite in keeping with the negative result of the investigation into a single point as the seat of the soul.

Let us pause a moment longer in order to become better convinced that the difference in function,which the physiologists attribute for our mental functions to different parts of the brain, is a completely safe assumption. One would have to assume it is true, even if the remarkable observations of aphasia and other partial, psychological disturbances resulting from localized brain damage had not been made. The mental activities such as we carry out in an instant present themselves as a very complicated whole even in the variety of simultaneous sensations and affections, and still more so in the conceptual thought and judgment and emotion which are tied to them. And this whole is by no means something, like the shape assumed by a body, which persists by itself until it happens to be transformed into another shape; rather in order to continue to exist it must be actualized anew at each moment. Now how could the brain accomplish this without quite a varied functioning of the individual parts, each of which makes its peculiar contribution? The richness and order which is present in our psychological thought would have to be conceived of as the effect, not of the complicated structure of the brain, but of a quite immeasurable complication which would be given at each individual point. It is quite another story if the functions of the different parts of the brain, which serve our mental activity, are different and if our soul stands in a direct causal relation with each of these different parts equally. Then it is understandable that corresponding to the complicated structure of the organ which serves it in various ways, it presents a whole of thinking activity which is itself extraordinarily complicated. Thus the discoveries of Pflüger and others of our physiologists correspond exactly to what we must expect; and so we find also that Pflüger declares himself most decisively in favor of the spirituality of the soul, which receives different influences directly from all the different organs. Flourens, too, was convinced of it.

458. And something else agrees with the result arrived at in this way. Our memories present to us a chain of events, in which we believe confidently by an instinctive impulse, although this belief appears to be no more justified by direct evidence than the belief in a physical, external world. And we regard this chain of experiences with the same instinctive confidence as something concerning one and the same individual. Connected with this is the fact that we look back on certain earlier deeds with pleasure as being worthy of us, while others we are ashamed of and bitterly regret. We are not at all able to free ourselves from this opinion. But only if the subject of mental activity is a spiritual one can it be called a correct opinion. If it were physical, then the subject of that experience which memory tells us about would be not at all identical with the subject of the mental activities which inner perception shows to us. This is the result if one regards the steady metabolism in the brain, but also, and more simply, when one is familiar with the demonstration that even merely by changing place each body becomes another individual.*

In truth, no one can cease to think himself identical with the individual appearing in memory, nor to regard as himself the future individual attaching to this in its earthly history, nor to take an interest in its fortune and misfortune as being his own. It is equally true that he cannot consistently regard that within himself which thinks and feels as something physical, but must rather see it as something spiritual. It is to be conceded that this argument cannot be called directly evident, like the one produced earlier. However, it could hardly be maintained that it is entirely without plausibility. And so, given that the earlier discussion produced an exact proof, this is then added to it as a welcome verification.

459. Certainly much more could be produced which would appear in its own way as fresh verification of the spirituality of the soul. Thus, for

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*Two things must differ from one another in some respect, according to the principle of the identity of indiscernibles. What is entirely without difference is identical. Now two bodies may be entirely alike in every respect (shape, size, quality), but not in respect of the place they occupy. So this is what constitutes the individuality of a body. If two atoms of oxygen exchanged places, each would be transformed into the other.

example, one could point to the fact that no acquired idea, no acquired knowledge, is ever passed on from parents to children, which would have to be called strange if the soul were a bodily organ, due to the contrast with other inheritable characteristics. But here I would have to enter into completely new, lengthy explanations. I would have to present the whole controversy over the possibility of passing on a characteristic newly acquired in the course of life, which has broken out fiercely between Weismann, who denies it, and the majority of other Darwinians, who claim it is possible. I would have to show how Weismann also means to explain the most astonishing instincts by means of heredity, from his standpoint of gradual development, in order finally to demonstrate that from the standpoint of all Darwinian factions the universal fact that there is no inheritance of sense perceptions, cognitive concepts and knowledge is the opposite of what one would have to expect on the assumption that the soul is corporeal. In doing that I would be demanding fresh efforts of you that are all out of proportion to what is to be gained from them. Indeed, their result could not be regarded as a separate, valid proof since there is already a valid proof in the discussions carried out so far, which must therefore itself be called sufficient.

460. The demonstration of the spirituality of the soul is the more difficult part of the psychological proof of a creator. The last step follows easily.

The unextended, spiritual substance cannot originate from the parent organisms by means of procreation, so it must either have existed beforehand, or have come to be at a determinite point in time during embryonic development.

Against the first assumption there speaks the fact that nothing and no one shows the slightest trace of evidence for such pre-existence, whereas the soul is rather such that its earlier experiences exercise an influence over all subsequent times.

Thus the second assumption gains the advantage. But then it appears, if possible, even more clearly than in the case of bodies, that the spiritual substance must have been produced by a consciously operating creative principle. For it is easier to assume that a spirit can make a body, once it has an idea of one, than *vice versa*, that something having consciousness arises from an unconscious principle. (Similarly, motion leads more easily to rest than rest to motion.)

461. To be sure, if we think the soul comes to be by means of creation, then we must reckon with a succession of creative acts, while many think that creation was accomplished rather with a single act. But nothing justifies them in this. On the contrary, the optimistic idea which the greatest theists held to be a consequence of the belief in God appears even

to require such a succession of fresh creative acts. A fully realized infinity of quantity and extension is not achievable at any point in time.

Might one object that this would explain the miracle of persistence through time? By no means, as long as we just regard the creative activity of the first principle not as irregularly arbitrary, but rather as emanating from a unified and inviolably adhered to universal plan.

As regards the creation of souls in particular, it is to be regarded as a law that a soul always and necessarily comes to be as soon as an organism is ripe for undertaking interaction with it.

462. But is such interaction actually conceivable between two things as different as an organism and an unextended, non-corporeal substance are? And how is it to be explained, then, that my soul is able to have a direct influence only on this my own body, although as something which actually has no place it cannot be spatially closer to my body than any other soul is? In fact, these two questions have been raised in the trend to show that the assumption of spirituality is impossible.

However, with respect to the first Descartes has already pointed out that we also cannot say how one body affects another body, and he promised to answer the other question for anyone who could answer this one. One realizes how appropriate his remark was when one sees that still today no one is able to explain the fact of gravitation. Also the fact of inertia, of the persistence of a motion with undiminished velocity in the direction of the tangent, is so far from being self-evident that it was overlooked for centuries. Even the great Archimedes had no inkling of it. But the reason for it is a *qualitas occulta* still today, and will surely remain so forever.

463. Nevertheless, the world did not wish to rest with Descartes' remark. A great variety of hypotheses were thought up: Occasionalism, pre-established harmony (Leibniz), a plurality of divine attributes the modes of which correspond throughout (Spinoza). But these never took anybody anywhere except to absurdity. However, if someone asks after the reason for such behavior (which, as one might think, the idea of our ignorance about the specific differences of the nature of our soul would cause us to avoid), then the answer is that our ignorance has not been made sufficiently clear. For Descartes himself took thinking to be, not a property, but the very substance of the soul.

Then there came the opinion that similar things can only cause similar things, but such heterogeneous substances as spirit and body are incapable of having homogeneous properties. This contention was a prejudice, indeed quite contrary to experience, for example, the experience that the will is determined by ideas and judgments. Also it is obvious that even if a body were the subject of thought, still a non-thinking body which produced it would give rise to a property which is not similar to its own.

Indeed, one could say that such a dissimilarity would agree better with its affecting something unlike it in nature than with its affecting something like it in nature.

One thus recognizes the complete futility of this objection, which has stirred up so much dust.

464. And something quite analogous is then to be said with respect to the other objection which finds enigmatic the limitation of the connection to one single body. Here, too, the imperfection of our knowledge of the nature of the soul and the real properties of bodies is entirely forgotten. Surely it is certain that the human soul stands in a relation of direct interaction with more than one point in the brain and also with parts having different constitutions. However, their difference need not go so far that no single design would be common to them all and have the result that these parts are equally capable of communicating with this individual soul. Though it can't be ruled out *a priori* as utterly absurd that the same design should also be present in another brain such that the same soul would animate two bodies simultaneously, still this seems by no means to be required. One easily recognizes that this would have to have very disadvantageous results. Great confusion would ensue. Now, however, we see each organism ordered in such a way as to give rise to the appearance of the most wonderful teleology. It can hardly surprise us, then, if in this connection, too, something which would be so inexpedient is utterly out of the question as far as our experience reaches.

COMPLETION OF THE PROOF OF THE EXISTENCE OF GOD

465. The result, to which we have been led equally by different routes, was: The existence of an eternal, creative principle (intelligence) which creatively maintains what it creates. And so all that is missing for a proof of the existence of God is just the demonstration that this creative principle (intelligence) is an infinitely perfect being and that it is a single being.

Let us see how we shall be able to show this, too, on the basis of the results of the investigation so far. How shall we be able to prove its all-embracing perfection, its unity?

466. Let us show its infinite perfection first of all. Then its unity will easily follow from that.

As in the demonstration of a world-ordering intelligence, of a first, unmoved mover, of a creator of the soul and a creative maintainer of contingent substances generally, we have again referred here, too, to its works.

If we succeed in showing that the creative power, even though it does not produce an infinite work, is still infinitely superior to any finite thing because of the way it works, then this will enable us to infer its infinite perfection.

467. But this we can do, and at that, in several ways.

First of all: the more quickly something is done, the greater is the efficient power. Thus a fire is the more intense, the more quickly it can raise the temperature of a given quantity of water from 0 degrees to the boiling-point; and an impulse is the more powerful, the more quickly a given mass is moved by it from one place to another.

Thus the time required for producing a given effect can be very different, according as the quantity of kinetic energy is different.

Nevertheless, given that the power is finite, it will require a determinite period of time. If it required no time at all, if an efficient principle rather produced an effect, however small it might be, in an instant, then as a point in time is to a period of time, so would this efficient power be in no proportion to those finite powers the works of which experience shows to us. It would have to be infinitely superior to them.

But so it is with creative works. The entire effect is set forth instantaneously. Of course, it is not as though the creative power does not work over a period of time. On the contrary, during the existence of its creation it must continually act in maintaining, and the cessation of this maintaining activity would mean annihilation.

Maintaining the creation is a continuous, creative work, and no creature can be creatively produced which is not creatively maintained for a period of time, be it at rest or in motion.

But all the same, this does not obviate the difference which we have urged. For even if the creative power works over a period of time, then it works from the beginning onward, and at each moment in time while the whole is maintained.

And so the creative power must be infinitely superior to the powers which work within the sphere of our experience.

468. And by another way: The less something is disposed to receive a given effect, the greater must be the power by which this is to be brought about. So if something were infinitely ill disposed for some effect, as perhaps if a body were infinitely far removed from a certain place, then in such a case the effective power would have to be an infinite one.

But this holds true when, corresponding to the efficient principle, there is no material at all receptive to the effect. For the absence of any capacity stands in no proportion to any actual capacity no matter how ill disposed (it is related as an absence of real being to any real being).

Therefore the power which produces something creatively is necessarily infinite. And from infinite power follow infinite being and infinite perfection.

We thus see that what we have shown to be creative we must also assume to be infinitely perfect.

469. And this also finds its confirmation in everything that the teleological proof revealed, even before it led to a creator, about the knowledge and power of the ordering principle.

Its ordering presupposes a knowledge which is utterly incomparable to ours.

If we just look at the variety of complications which gravity produces for the movements of the stars with respect to one another, then we face without hope the problem of calculating their paths mathematically, with all their deviations. We are not even in a position to work the problem for three bodies in gravitational relation with one another, given the methods offered so far by mathematics, on account of the excessive complications. How much less so where each of countless stars exerts its attracting influence on each of the others. Only by overlooking the smaller deviations and being satisfied with an approximation do we achieve the only thing achievable by us.

But it would be a much more complicated problem to follow, by calculation, the movements we see the bodies found on earth are subject to, as a result of gravitation and other mechanically active forces. No one, even if he were given all the precise circumstances, could possibly calculate with full precision the shape of a cloud of smoke rising from a chimney or a pipe, or the shape assumed by a wave on a river, without an infinite increase of his cognitive powers. Now what should we say when we look at the totality of mechanical effects which intersect at every single point on this terrestrial sphere?

And yet, if only gravitation and the mechanical forces were acting, the problem would have to be called comparatively very simple as opposed to what actually occurs.

There are in addition the activities of all the other physical forces, heat, light, electricity and others. And the physical changes are accompanied by chemical transformations in inorganic processes as well as in the much more complicated organic and physiological processes. And in conscious life, the laws of psychical phenomena go hand in hand with the laws determining physiological processes, and the complication increases once again. If one poses to oneself a problem as insignificant as how high a certain hair will be raised on the tail of a certain horse now being bitten with a certain force by a certain mosquito at a certain place on its body--how high, that is, the hair of its tail will be raised to brush off the mosquito--then one has a problem in which, beginning with the mechanical laws right on up to the psychical ones, they all concur with one another to produce such a complication that the mere idea that one should come up with a perfectly precise solution is staggering. And yet every subsequent event in the course of the world's development depends somewhat on this, and from the stars to the boundaries of the universe there is nothing the course of which would not somehow be influenced by it if the hair were raised even just the trillionth part of a tenth of an inch higher, or less high.

How incapable our intelligence would prove to be, even if everything which now obtains were seen by it, to calculate precisely even just the next moment. And if it were given an indefinite amount of time and any number of co-workers, it would still be unable to solve the problem.

But the world-ordering intelligence foresees not only the next state of the universe in this way, but also all successive states throughout immeasurable time.

And there cannot be the least deviation between its idea and reality. For if that were to happen, then because it is unable, on account of its impassibility, to rectify the mistakes in its foresight through experience, it would completely lose dominion over things. *Parvus error in principio, maximus in fine.* And if it were once to show such a weakness, however slight, then in subsequent times fresh, infinitely small errors would creep in, and since each intensifies the next, its work would now be led to purposes quite different from those the intelligence had in mind, and engulfed in chaos.

Thus we see that the inference we drew from the creative efficacy to infinitely superior power and perfection is also confirmed by these considerations.

470. And nevertheless one objection seems to remain possible. Someone could say, we have showed the infinite superiority of the creative principle to our power and to other finite powers, and thus we have showed there is an infinitely greater perfection. However, no divine perfection is proved thereby. For the mathematicians distinguish infinite quantities of lower and higher orders. And so, with the demonstration that something infinitely exceeds a finite being in perfection, its absolute perfection has not yet been shown, but only this can be called divine.

471. The objection is clever enough and subtle. Yet I believe we are in a position to respond to it in several ways.

First of all, if one has paid careful attention to the foregoing proof, it is not difficult to see that it serves to demonstrate that the creative principle has not only infinite superiority, but rather an infinitely many times infinite superiority, indeed, a superiority "of the most infinite order of infinity."

We said, the finite powers which we know effect the very least thing that they effect only gradually, the creative power creates instantaneously. Now since a moment stands in no proportion to the shortest period of time and, like the point in a line, is contained in it infinitely many times, it follows that the creative power must be infinitely greater.

Alright! A point is contained in a line not merely not merely infinitely many times, but infinitely many times infinitely many times, indeed, in this relation, if it may actually be called that, every order of infinity is surpassed.

For a point is a zero of length, and 1 divided by 0 does not yield an infinite number of the first or second order, as 1 divided by an infinitely small quantity of the first or second order would do--rather in yields absolute infinity.

472. But we can still show the infinitely perfect being in another way, namely, by showing that the power of the creative being whose existence we have proved extends, not just infinitely further than our power, but as far as logical possibility.[40]

473. In order to show this, however, we must first establish the unity of the first principle and its universal efficacy.

In this connection it is clear above all that the creative principle whose existence we have proved is creator of everything that belongs to the universe, or has or could have an influence on it. For only in this case--we have seen this in the discussions of the teleological proof as well as in the proof from motion--can it have knowledge of the universe. And without possessing this knowledge it cannot know whether, or to what degree, even what it creates and knows as its creator has suffered a change. But it does not suffer anything, and as a result it is incapable of receiving any impression even from that which it has created.[41]

As a result its work would become a very uncertain one and, even if the disturbing influence occurred only once and was insignificant in itself, in the course of time it would develop quite differently than was intended. The creator would stand by completely helpless. If something has a disturbing effect on our work, we can quite often compensate for the disturbance, as for example, when a gust of wind blows away the page we're writing on; but he, who is incapable of suffering anything, he, the creative and, as we have already showed, the infinitely more perfect intelligence, in such a case he would quietly continue to write on the bare desk without suspecting a thing.

If this is not to be accepted, then the creative activity must be thought to extend to everything that the universe contains or that stands in causal connection with it.

And the creative intelligence is to be regarded, not only as the creator of everything that belongs to the universe, but also as its sole, first cause. For the latter is contained in the former.

474. But with this it is also obvious that there is only one, single being which is necessary in itself and which has creatively produced everything which exists in addition to itself.

Or let us assume that there exists something in addition to it and independent of its activity. How shall we think of this? Perhaps as likewise equipped with creative power? Then the question arises as to what it will be capable of creating. Obviously either the same beings as our creator, or higher ones, or lower ones.

But the first is impossible. For the one creative being would have to disturb the other. The one would carry off the same things "right out from under the nose" of the other.

But so is the second; for if it could create even higher beings, it would be that much easier for it to create the same ones.

The third, then. This might well seem to be the most acceptable and a welcome means of escape, if only it would not then be true of our creator that he could create the higher beings and thus also the same ones that the other creator can.

So we cannot very well believe that being to be endowed with creative power. But even if it has no creative power, surely it must still be thought somehow capable of some kind of efficacy either with respect to itself or with respect to something else. And since, as has already been shown, it can have no influence on this world, it follows that acting, being acted upon, and changing are possible outside of this world.

But every change requires a creator as its pre-condition. And so we have the earlier argument again.

Therefore if there is really supposed to be a being which exists uncreated by the first cause of this world, then we must think it to be devoid and empty of any capacity to act. But that is quite impossible, and least of all could it be assumed that such an extraordinarily unpowerful and imperfect existence is necessary in itself. The creative power, which produces so many more perfect things, would certainly comprehend this weakest existence in the sphere of its authority.

475. Thus the first and creative principle which we have proved is the single, primary cause of everything which exists in addition to it.

And from this it follows that it is all-powerful.

What does this mean? That it can do everything which is possible. But a possible thing is spoken of in two senses. First, that is called "possible" for which the conditions are given, secondly that which is logically possible. (That the concept of which includes no contradiction, no absurdity.)

It is clear that the creator can do the first; for in addition to him and his creation there is nothing, and he can do everything that these can do, and naturally, everything that he himself can do. But this would not suffice.

However, he can also do everything which is logically possible. For assuming there is something logically possible which he can't do, this is either unconditionally possible or conditionally possible.

If the former, then it could really be without being created by him, which is impossible according to what has been said. So only the latter, then, since perhaps the necessary conditions are missing.

But if the thing is conditionally possible, then the question arises whether all its conditions, those nearby and those further removed, are possible. Then together with them it would be possible unconditionally (unconditioned by anything else). So it, too, could really be without being effected by the creator.

But if one of its necessary conditions is impossible and contradictory, then it is, too.

So the first principle of the universe is capable of everything which is logically possible, thus it is all-powerful. Therefore it is infinite existence, absolutely perfect, not merely infinitely more perfect than we are. Therefore it is God. For that was the concept of God, whose reality we wished to prove: An absolutely perfect being, which is the single creator of all the things that have an existence in addition to his.

THE TRAIN OF THOUGHT IN THE PROOF OF GOD'S EXISTENCE (1915)[42]

PART ONE: ON THE NECESSITY OF ALL EXISTING THINGS

I. THERE IS NOTHING WHICH IS ABSOLUTELY ACCIDENTAL

1. Just as a judgment cannot fail to have a qualitative mode, so a presentation cannot fail to have a temporal mode. And it follows that a judgment also cannot fail to have a temporal mode.

2. This indicates that there cannot be anything which does not exist in time. If a thing actually exists, then it is present.

3. But the present is a boundary within a continual process, and as such it is nothing in itself. Consequently, everything which exists must, for a time, persist unaltered, or else succumb only to an infinitesimal alteration.

4. This clearly shows that a thing cannot exist by accident, for if an accidental existence were possible, then an accidental beginning and end would also be possible. (An eternal accidental existence could only be understood as an existence which has no beginning and which repeats itself.)* And at every single moment, a fluctuation between being and not-being would be at least as probable as a completely unaltered being or not-being, or an infinitesimally brief persistence in being or in not-being. But on the other hand, it would still be absolutely necessary[43] that the cases of a persistence, or of an infinitesimal process, be infinitely more frequent

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* Democritus said that one need not ask for the ground of the existence of that which exists eternally. Thus he held that an accidental eternal existence is conceivable, although to be sure, not an accidental beginning. In the case of an accidental, eternal existence there would obviously always exist a relative necessity of the later existence *vis-a-vis* the earlier. Nevertheless, neither the existence of the whole, nor of a part of it, would have an absolute necessity. It would have neither a direct nor an indirect necessity. Indeed, indirect necessity cannot exist without direct necessity. And a whole which has parts can only have direct necessity if each of its parts does. Thus every part of an accidental, eternal existence would be relatively necessary, but absolutely accidental. But the whole would be neither necessary relative to something else, nor absolutely necessary. So it would be absolutely accidental.

This case, in which everything which is, was, and will be assumes a relative necessity with reference to all its predecessors, is not free from internal contradiction, as can be shown most easily and intelligibly if one inquires into the results which this assumption would have for the probability of the occupation or emptiness of spaces. (See paragraphs 6-8.)

than the cases of such a fluctuation between being and not-being. This is a contradiction.**

5. Consequently, everything which exists is necessary.***

6. What we have thus shown for all things which exist may be demonstrated specifically for physical things, since one can rest such a demonstration on the continuity of space analogously to the way in which the preceding proof rests on the continuity of time. If the occupation of space were absolutely accidental, it would have to be said of a straight line that at every single point an abrupt fluctuation would be just as probable, or no less so, than the absence of such a fluctuation. And yet it would have to be said that there must be infinitely more points at which a fluctuation does not take place than points at which it does, which is a contradiction.

** The conclusion, which I draw here, of the absurdity of the doctrine of an absolutely accidental existence or occurrence, is similar to the one which Bolzmann once arrived at when he and I put certain remarks of Bertrand's to the test. Bertrand's remarks related to the question of what degree of probability would result if one asked whether the chord of a circle (of which no further specifications are given) would be longer or shorter than the side of an equilateral triangle to be inscribed in the circle. Bertrand wanted to demonstrate that one would be equally justified in giving three different answers, of which one would determine the probability that the chord was longer than the side of the triangle at 1:1, the other at 1:2, and the third at 1:3. Bertrand held that in this case the paradoxical result of three solutions, arrived at by flawless methods but mutually contradictory, is to be attributed to the fact that the question was badly put: "La question est mal posée." But he doesn't say why it is badly put. And if, like Czuber, he should hold that the question is badly put because nothing is specified about how the chord is constructed, that would be an evasive answer. To provide such specifications increases the indeterminacy, nevertheless it is not clear why, in view of such greater indeterminacy, there could not result an even more certain ratio of probability, but one which could naturally only be a single ratio. Poincaré, who took Bertrand's inquiry into account, concluded in opposition to him, not that there is a mistake in the statement of the question, but that there is a fault in the whole theory of probability, namely that its first assumptions are arbitrary. And then we see that he closes his essay on probabilities by repeating the cheerless words, that we can only know that we do not know anything.

Bolzmann knew very well that neither Bertrand's opinion, nor that of Poincaré, could be approved of. But he was no more able than they to discover a mistake in any of the methods employed by Bertrand. So he was logically led to the conclusion that a contradiction must already be contained in the presuppositions which led to the three contradictory results. And this contradiction could really only lie in the assumption of a continuum. So he viewed this as a strong confirmation of his conviction, which he'd already acquired on other grounds, that the thought of a continuum is afflicted with irresolvable contradictions.

Thus Bolzmann drew a conclusion in this case which is entirely analogous to what we have said above. And in fact his conclusion would be undeniable, and Bertrand's discussion would count decisively against the possibility of a continuum if, in truth, no mistake had crept into the three methods of determining the probability.

The possibly infinite increase in the number of souls, due to the possibly infinite increase in procreation, shows that this argument can be applied to the non-spatial objects in the domain of our experience, as well as to the spatial ones.

7. The argument against accidents in the realm of spatial extension could also be used to show that the *a priori* probability for each place in the infinite possible space that it be occupied by a body must be equal to,

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***This seems to be the place to consider Hume's contention (which Kant also adopted) that nothing can be absolutely necessary. He appealed to the fact that only the impossibility of what is contradictory can be obvious *a priori*, and also to the fact that one who simply denies something is not in the position of affirming and denying one and the same thing, since he really doesn't affirm anything at all.

Now there are many who maintain, in opposition to what Hume says, that apart from the possibility of what is contradictory, still other impossibilities are also obvious. And they give as examples the impossibility of certain positive oppositions. Thus they say it is impossible that a triangle, as such, should think or be warm; and further, that it is impossible that a red thing not be a *species specialissima*, and that a colored thing be a *species specialissima*, and that a real thing, as such, not be a *summum genus*; and further that it is impossible for there to be a white horse which is black, and so on. They also say it is impossible for something to have a comparative, relative determination without having an absolute determination; and further, that it is impossible for things which are spatially or temporally separated to affect each other; and further, that it is impossible for material substances to penetrate one another spatially. But nevertheless, others adhere to what Hume says, that the impossibility only of what is contradictory is apodeictically obvious to us. For they want to demonstrate that, in all the cases just mentioned, those who have properly analyzed the pertinent concepts can pick out a property of the thing to which the attributed property stands in a contradictory relation. So if one were to compare one who thinks of a triangle as such with one who thinks of a thinking thing as such, one would notice that the one thinker is, as such, different from the other. One would notice that the thinker-of-a-triangle is, as such, not a thinker-of-a-thinking-thing; and in light of this the contradiction is clear in the contention of one who says that the triangle is, as such, a thinking thing. It is said, similarly, that anyone who maintains that a warm thing has, as such, a colored thing as its genus falls into a contradiction, because he knows that the concept of a colored thing is not contained in the concept of a warm thing, which the relation between genus and difference would require. Something similar holds for the other cases mentioned above, and for still others, for example, the propositions that an evident judgment is not true, that it is not correct to prefer knowledge as such to error, that something which exists is not present, and the like. Therefore, without going more deeply into the controversy, let's let Hume's contention stand, that nothing but the incompatibility of contradictory determinations is apodeictically obvious to us. However, we must point out that the contention, that nothing but the impossibility of the union of contradictory determinations is apodeictically obvious to us, is not identical with the contention that nothing but the impossibility of such a union could be apodeictically obvious to us. There is no contradiction in the opposing contention; and so it is precisely if we adhere to the idea,that only the impossibility of what is contradictory is obvious, that we must then affirm that this proposition could only recommend itself to us as a law of experience. There is no exception to it in the realm of our experience. Moreover, Hume himself is decidedly a determinist, and determinism is connected with the acceptance of laws of succession which cannot be understood as cases of the law of noncontradiction.[44]

or at least no less than, the probability that it be unoccupied. And yet in the whole space infinitely more space must be unoccupied than occupied. For the totality of all things, just as surely as it must amount to a finite number, is necessarily limited to a part of space which appears to be infinitely small in comparison with the part which remains completely empty.

From the possibility of infinite reproduction of the physiological prerequisites for the possession of a soul there follows the possibility of

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Thus we would also have to accept impossibilities which were not cases of contradiction. And so it could certainly turn out that positive necessities exist, and that even if they are not immediately, apodeictically obvious to us, their existence can be proved with evidence on the ground of evident facts of experience.

With regard to the question, which we have touched upon but not dealt with thoroughly here, of whether all axioms are cases of the law of contradiction, everything depends upon two considerations: 1) whether one holds certain instances of knowing a comparison -- in which cases the one thing compared is determined to be different and thus, on a certain view, contradictory to the other -- to be evident; and 2) whether one considers that such compared determinations are themselves not known apodeictically, but rather assertorically. For without such compared determinations the contradictory properties would be missing, but they are the prerequisite of the contention that all axioms are cases of the law of noncontradiction, according to the form of that law. If one says that those instances of knowing a comparison are themselves apodeictic, then it is obvious that one holds there can be apodeictic knowledge which is itself not a case of the law of noncontradiction. If one held the opposite, one would come to the opposite conclusion.

Now which of these alternatives is to be preferred here? -- In support of the view that knowledge of comparisons is not to be designated apodeictic it seems it may be said that comparative judgements contain an affirmation of the subject, which affirmation is certainly merely assertoric.[45] Also, the proposition, "I think," is generally taken to be an evident, assertoric proposition, and so is the proposition that I affirm my existence with evidence. To this latter proposition there may be attached the apodeictic contention that anyone who affirms his existence in the way I affirm mine cannot possibly judge incorrectly.

Perhaps one could mediate between the two parties by pointing out that a multiplicty of judgments are united in comparative determinations, just as in general cases of positive or negative predication involve the affirmation of the subject.[46] Thus the comparative judgement would certainly not be purely apodeictic. However, it may have a partially apodeictic character. Axioms, on the other hand, would have a purely apodeictic character and would be simple rather than double judgments.

Descartes said, what is clearly and distinctly included in the concept of a thing can be affirmed of it with certainty. -- Perhaps it would be in order to say instead, "what, by reason of evident comparative determinations, I myself clearly and distinctly include in the concept...etc." Insofar as I think of something under one concept and under another concept, I can certainly maintain apodeictically that a thing which falls under the one concept cannot exist without a certain relative determination. For example, if I know by comparing them that insofar as I imagine something red and something colored, I imagine that the first is contained in the second as a specific determination, then I can maintain apodeictically, in view of this, that no red thing could exist which is not a specifically determined colored thing.

indefinitely many souls. And from this it would follow, supposing that a soul could exist by accident to eternity, that on the one hand it would be just as probable *a priori* that each soul exist as that it not exist. And yet on the other hand it would be necessary that infinitely more of the possible souls not exist than exist, which is a contradiction.

8. To these considerations,* which make known the impossibility of the accidental, one could add still others which confirm the conclusion.

If the existence of a body at a place were directly accidental, then it could be that the existence of a body at any place you like would be just as directly accidental. And if one asks, whether the possibility of the one hinders the possibility of the other, this must be denied. Each place is at least as easily occupied as empty. The probability of being occupied would not be less than one half. It is only because of the impossibility of infinitely many bodies that there must be infinitely more empty space than occupied space. And thus we'd have a contradiction.[47] Just as in this case what is possible in *sensu diviso* would also have to be possible in *sensu composito,* so it is in other cases when several positive, opposing entities could each, in themselves, contingently exist or fail to exist, become or fail to become. True as it is that positive,opposing entities cannot exist together, it is just as true that not only together but also by themselves the entities cannot both come to be and fail to come to be under the same circumstances.

9. But the demonstration that everything which exists is necessary does not show that everything which exists is directly necessary. An indirect necessity also suffices, and is given whenever something is caused by something else and made necessary in this way.

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*One could object, against this proof of the impossibility of an accidental beginning and end, that the assumption remains conceivable that the possibility of such accidental beginnings and ends exists only at certain, single moments of time, although at all other moments accidents are possible. But this assumption presupposes a difference between certain moments as such and the infinite multitude of other moments, and this is contrary to experience. And how would one explain this difference? We would have to assume that there is a real being which entirely transcends us, which is continually in the process of infinitesimal alteration, and which influences all temporal things. This influence would make temporal things regular over a period of time and make their processes necessary. At the temporal boundary of this period, however, the suspension of every law would occur for a moment, and so would the accidental, although after this instant there would be a new period of necessity. The absence of laws, which stands in such stark contrast to the preceding and following circumstances, would be without any duration. What seems to be inadmissible, and makes the absence of laws appear to be afflicted with contradiction, is that it would take effect by means of a moment in the process of that transcendentally real thing. This being has previously determined the moment to be such that it be indeterminate now.

II. NOTHING WHICH WE EXPERIENCE IS DIRECTLY NECESSARY

10. It is experience which shows that something exists. From what we have just explained it follows that what we experience as existing is necessary. Now we must ask whether such things are not merely necessary but also directly necessary. And it is not hard to see that this question is to be answered negatively.

11. Thus bodies cannot be directly necessary. For it is essential to each body that it have a location. But every place is as easily occupied as empty, just as one particular place is. Only the actual occupation of all parts of all possible spaces is unthinkable. An actually infinite extension is a contradiction. One can most easily make this intuitive if one thinks of a rod which has a beginning but has no end. If such a rod were pushed in the direction of its length so that its finite end reached to a point which had earlier been a meter away from it, then the length of the rod would be entirely congruent with its length before it had been moved, but still it would extend a meter farther. If one were to imagine the rod divided into four equal parts, and each of these likewise divided again and again until we had perfectly congruent cubes; and if one were to remove the first cube, the third, the fifth, etc.; then one could imagine all the remaining cubes being pushed so that the first takes the empty place next to it within an hour, the second does so twice as fast, the third three times as fast, the fourth four times as fast, and so on, each moving at the same time and in the same direction. Obviously they would all be joined together again after an hour. Then all the places previously occupied by the total number of cubes would now be occupied by half of them. So it would appear that two congruent lengths were not equal.

12. It is also easy to demonstrate that our psychological life is not directly necessary. In every conclusion we draw we notice the causation of the premises, or rather of the thought of them. And in every choice we notice the motives which determine us to make it. Also, what maintains our hearing, smelling, tasting, touching and every other psychological activity is not the law of inertia, but rather a constantly renewed causation.[48] And as regards the subject of these faculties, some think it to be physical, in which case we have already produced the proof that it lacks direct necessity. And if others think this subject is non-physical, it is still undeniable that in view of the possibly infinite reproduction of the physiological requirements for the subject's coming to be, it could be thought that the subject itself is also infinitely reproduced. But since an actually infinite multiplicity of things is as impossible in the immaterial as in the material realm, it is apparent that also in this case direct necessity must be denied.

Hence it follows that even though what we experience is necessary, still none of the things which we know through experience is directly necessary. Consequently these things must be called indirectly necessary.

PART TWO: ON THE FIRST, DIRECTLY NECESSARY CAUSE

I. The Directly Necessary Being is Transcendent

13. Contingency in the world of experience shows that there must be something else which is directly necessary and which makes the things we experience indirectly necessary.

14. Someone might be of the opinion that this conclusion is unwarranted, that it would suffice to say that something, which is itself only indirectly necessary, makes the indirectly necessary things we experience necessary. Then naturally this will have yet another thing as a necessary condition. But perhaps this further thing could also be only indirectly necessary, and so on *ad infinitum*. However, one who reasons in this way easily contradicts himself. For in such a case the whole series of things which are designated indirectly necessary would appear to be accidental; and everything we have said against the possibility of what is absolutely accidental would still hold good. One might think, for example, of a succession of physical objects, each of which produced the next. If such a succession could occur somewhere, then it could just as well occur at any other point in space one might pick. But it could not occur at all points in space, and thus its occurrence at any point would appear to be accidental.

II. The Directly Necessary Being is a Creative Principle

15. It has been rigorously proved that there is something outside of our direct experience which, in opposition to the things of experience, is directly necessary and must be regarded as the first cause of the things of experience. And it is vastly different from all that we experience not only because it is directly necessary, but also because it can produce something out of nothing. It is true that the causation which we experience is also of two kinds. One kind of causation leads to a transformation, as when something angular is rounded off. The other kind leads to a simple actualization, as for example when someone who is a hearer-of-nothing becomes a hearer by means of the indirect influence of a sound wave. However, even in the latter case there is, in addition to the effective power, also a subject which accepts the effect. For the activity of the directly necessary being, even such a subject is not required. What it causes in the sense of actualizing it also produces out of nothing. Whether its activity is thought to have a beginning or not, there exists no subject to

be the prerequisite further condition of the existence which the directly necessary being causes.*

16. We just said that what we've stated about the peculiarity of the activity of the directly necessary being would hold equally whether its action begins at a certain point in time, or has no beginning. It might appear useless to distinguish these two possibilities, since if none of the necessary further conditions is missing, then the effect of a cause takes place when the cause itself is given. But it appears the directly necessary being must have existed from eternity; and no indispensable further condition of its activity can be missing since indeed no further condition is required. But the fact is overlooked that the directly necessary being, as surely as it exists, also exists in time. And above all it is overlooked that the directly necessary being can just as well be thought to be a directly necessary process as it can be thought to be a directly necessary, unchanged, continual existence. Similarly, among indirectly necessary things besides bodies at rest, bodies in motion in a certain direction at a certain speed are also conceivable. Indeed, it might perhaps be possible to demonstrate that persistence through time must itself be viewed as a certain real change.[49]

III. The Directly Necessary Being is not Changeless

17. But without taking this possibility into consideration now, we can state most clearly that the directly necessary being cannot be thought not to change at all. We have concluded that it exists on the basis of what we experience. It proved to be the cause which makes what we experience indirectly necessary. But what we experience is evidently not changeless; and it is absolutely impossible that something which is itself changeless should be the cause of a change. In this sense, Trendelenburg said quite rightly that it is conceivable that motion should lead to rest, but not that rest should lead to motion. Earlier philosophers were not as well aware of this, and therefore thought the first principle, which is necessary in itself, to be perfectly changeless. Nevertheless, at least the most significant of them all, Aristotle, sensed very well the questionable element in this contention. And with this in mind he took pains to render conceivable the emergence of motion out of what is unmoved by assuming a special nature of the change which is produced by what is unmoved. The first motion was

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* One could object to this that it has not been proved that the directly necessary being acts without acting on a subject, rather only that the subject must also be a directly necessary thing. However, it may be replied that what has a place must, as such, be an ultimate subject, since otherwise it could not be individuated in terms of its place. But it is precisely of what has a place that it has been proved that as such it could not be directly necessary.

supposed to be the completely uniform circular motion of a celestial sphere, and thus in this change, like always takes the place of like. If this were the case, then the activity of the first unmoved mover, which has no beginning, would also appear to be always the same. Then the moving sphere was supposed to have an effect on other spheres, and with them and by means of them, on the terrestrial world. And by virtue of the stars which shine on it and on the other celestial spheres, it was supposed to result in the whole process of change by generation and corruption. Astronomy has long since destroyed the illusion that there are such spheres, and perhaps it would not be so very difficult to show that they would not achieve what Aristotle promised they would anyhow.

18. In addition to this, Aristotle considered it necessary that his first unmoved principle be thought of as a mind which thinks of a good according to which all things are ordered as to their goal. Thus, according to him, the first principle knows and determines all things. Now if it knows all things, then it must know all truth, and since not everything which is true is always true, it must not always know what it once knew. If it knows now that something does not exist but will exist, then it knows later that it is and still later that it was. Similarly, it wills at one time that something come to be, and at another time that it exist, and again at another time it will be pleased that it has been. And so Aristotle cannot maintain, without contradiction, that his first principle is entirely unchanging. The contention that it is an active, purposeful intelligence seemed to Aristotle to be required by the fact that in the whole realm of experience nothing else is to be found which moves things although it is itself unmoved. Now it is apparent that even his intelligence is not moved while being itself entirely unmoved. Therefore it is quite out of the question to think of the first principle of a change as being itself entirely changeless.[50]

19. If Aristotle erred in this connection, then we must ask whether he was not perhaps right to teach that the first principle, which is necessary in itself, must be an intelligence. The reason which we have just heard him offer for this, namely that the first principle must be changeless, has indeed been shown to be inapplicable. But other arguments present themselves and serve to secure his doctrine on this point.

IV. The Directly Necessary Being is an Intelligence

Four proofs of this

20. We have seen that physical objects are ultimately produced out of nothing. Now if we assume that they are produced by a blind activity, this would be to assume that there is something directly necessary which

blindly fills a certain space, and must fill it. But the assumption would also be that there could not be another directly necessary being which is similarly able by blind activity to fill a certain other one of the infinitely many parts of space. Everyone will reject such an assumption in view of the indifference of location in space. It would be just as paradoxical as the assumption that the filling of certain spaces was directly necessary and the filling of all others was not directly necessary. But it does not appear to be likewise absurd if someone says that an intelligence, which has thought of all possible spaces, has chosen a part from among them. Such a choice is conceivable just as surely as every place is somehow different from another, since the differences between places are not such that it can be assumed without absurdity that beings which are necessary in themselves, and which blindly actualize the places, are attached to some of the places but not to others.

21. Furthermore, if the first, directly necessary principles produce what they produce out of nothing, then it would appear that if they act blindly then they must have as many parts as what they produce has. Insofar as they are uniform, they could only result in a uniform product, since they have no further conditions of production which, in their multiplicity, would explain the differences of the things produced.* Therefore, the directly necessary being which produces the physical world must have as many parts as the physical world itself has, if it acts blindly, and therefore it must be extended in three dimensions. But then everything which can be said against the direct necessity of physical objects could also be said against the direct necessity of the directly necessary being. Indeed, one would be led to consider the directly necessary being to be itself physical. In any case, it would not improve matters if it were actually permissible to assume that the directly

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* Aristotle made reference to this idea. In Book XII of the Metaphysics he reproached Anaxagoras for considering it inconceivable, on the assumption matter is uniform, that many things should be generated as a result of a uniform principle acting on it. He interpreted Anaxagoras' doctrine rather freely, since Anaxagoras did not think of mind as acting blindly nor of that on which it acts as being without any multiplicity at all. But this doesn't alter at all the force of Artistotle's objection to Anaxagoras' doctrine. (According to Aristotle, Anaxagoras did not allow Chaos to affect Mind, and did not let Mind know Chaos *a priori* since Mind is not supposed to be its creator. Also, he must have conceived of Chaos as the mere capacity to be all things. But then neither on the active nor on the passive side would one have an explanatory principle for the multiplicity of what is produced.)

This idea reappears quite clearly--and probably quite independently of Aristotle--in Clarke's *On the Existence and Attributes of God.* It is among the most significant observations in this otherwise worthwhile work, which was well regarded by Hume as well as by Kant.

necessary being has more than three dimensions when it stands in a causal relation to what is three-dimensional. However, this difficulty does not exist for one who thinks of the first principle of the physical world as an intelligence, since the thinking of an extended thing has the entire multiplicity of itself as a completely unified object. And thus the will of an extended thing can also affect the entire multiplicity at once.

22. A third argument is associated with these two. We have recognized previously that the first cause, which is necessary in itself, could not be both changeless and the cause of a changing thing. But this doctrine seems to be rather astonishing at first if one should be of the opinion that something which is directly necessary must have been from eternity just as it is. And now, so far from this being the case, it is supposed that it was previously impossible for the directly necessary being to be as it is necessarily now, and what was previously directly necessary for it is now supposed to be directly impossible. So it is quite understandable why the greatest philosophers of all time held every change in the absolutely necessary being to be absolutely out of the question. In fact, such a change will only be conceivable if, so far from showing the earlier and later states of the directly necessary being to be in opposition, it is plainly required in order to rule out every opposition between the earlier and later states. But this is the case for the intelligence which knows and determines all things. If it believed earlier and also later that the same thing would first occur in a hundred years, and accordingly set out to produce it, it would be in disharmony with itself just as much as a man would be who planned to marry in a year if, after a year had passed, he still had the intention to marry in a year.

23. In addition to these arguments, there are the many experiences which appear to indicate a purposeful order in nature which far surpasses what is exhibited by human works of art. It has nevertheless been said (by David Hume) that this appearance of order can also be traced back to a previously existing order, which acts blindly in nature, as well as to a mind. A horse blindly brings forth a horse, and a lion a lion. It is precisely the more perfect orders which experience shows us that appear to be produced not by a mind but blindly by such a previously existing order. It is believed that the objection, that this explanation is not ultimately sufficient, can be countered by showing that, in tracing order back to an intelligence, order must likewise be thought of as previously existing. And thus, in view of the complication of the further hypothesis, tracing order back to an intelligence has no advantage over tracing it back to a previously existing order. However, this reply does not suffice. For one thing, it does not suffice in consideration of the unity of thought in the face of multiplicity, which we have already mentioned under the discussion of the cause of the filling of space. And more especially, the reply is

insufficient because in tracing order back to an earlier natural order the most important condition of an ultimate explanation is violated, since that which is designated the first cause can no more be directly necessary than can the order which is to be explained. In tracing order back to a thinking principle, the situation is quite different.

Thus Aristotle's doctrine concerning the first, directly necessary principle is surely mistaken in its contention that this principle is entirely unchanging. But it is just as undoubtedly correct in its contention that this principle must be understood to act, not blindly, but rather with an intelligence.

An objection against the teleological argument

24. This truth is of such importance that we may not disregard any of the attempts to weaken the impression of the arguments used to support it. It has been especially the fourth argument, which is nearest to the thought of the common man, against which such attempts have been directed. Darwinism wanted to understand the apparently purposeful order in the structure of organisms and in the instincts of animals, as well as the intellectual and moral assessments of human beings, as the necessary result of the exclusive preservation and accumulation of such accidentally occurring mutations as give one individual the advantage over another. With this by far the most significant part of the apparent teleology appeared to be attributed to blind necessity. And after such a far-reaching partial success of the idea, it did not seem out of the question that one day the rest could also be understood as a product of blind necessity.

But Darwinism does not hold up under criticism. Two parts of Darwin's doctrine may be discerned. The one teaches the development of one species into another. Darwin holds this in common with some of his predecessors. Therefore one can only credit Darwin with having furnished an abundance of facts which support the theory, and thus with having cleared the way for a doctrine which previously had been almost universally rejected. The other part is his original contribution, namely an attempt to explain the gradual transformation of living things, which explanation was supposed to replace those devised by Lamarck and others and to prove them invalid. This part is of principal significance for our question. But it is just as untenable as is Lamarck's attempted explanation. Without going into other matters--as, for example, Lord Kelvin's inquiry into the length of time in which the earth has been able to support organisms--let it only be said that the Darwinian explanation is applicable neither to the growth of new organs and their development up until they are first useful, nor to the perfecting of organs which are already highly developed and, so to speak, exquisite. The explanation does not apply to these latter because in such cases the numerical proportion of the possible advantageous accidental mutations to the disadvantageous ones reveals the disadvantageous to be in an ever growing majority. Darwinism, in this second part of it, proves to be a superficial anthropomorphism. Consider that such diverse organs as wood, leaves, flowers and roots develop when plants are exposed to different external influences. Further, the two sexes develop from the same seed, and there are cases of heterogenesis. And again, adaptation which takes place by a sudden leap is brought about partly by observation, partly by experiment. In view of all this we can know that nature has at its disposal completely separate means for the further development of species; which fact, so far from decreasing the appearance of teleology, increases it. What is said of ontogeny must also be said of phylogeny.* Moreover, it is not true that if Darwinism is tenable it would only leave an insignificant remnant of purposeful order unexplained. To mention one unexplained fact, it presupposes the possibility of reproduction, yet this is an achievement which puts human artifices to shame. Also, nothing is more mistaken than the contention of Kant that the appearance of teleology is limited to the organic world. Anyone who considers atomism to be established will find it amazing, as Maxwell does, that billions and trillions of atoms are exactly alike, as though cast from the same mold. But to someone who doesn't accept atomism the fact will be similarly amazing that despite possible division by every rational and irrational factor chemical combinations only occur in a few fixed and evenly divisible proportions. In addition to this general requirement of the natural order there are a great number of others which, if they weren't already fulfilled in the sphere of the inorganic world, would deprive the organic world of every possibility of being produced and of persisting.[51]

The Physical Certainty of the Four Proofs of the Creative Intelligence

25. There is yet another way in which it has been attempted to make less impressive the proof that the first principle, which is necessary in itself, must be an intelligence. It has been said that the proof is a mere proof of probability. And even if one can consider such a proof to be as good as a strictly conclusive proof when the proven probability is infinitely great, still one cannot so consider it when no calculation of infinite probability has resulted. And thus the doctrine of a directly necessary intelligence as the first principle of the world of experience would by no means be assured by what we have said.

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* Ontogenetic development begins with a blastula made up of identical cells which are able to grow into different organs according to the position of the blastula in the mother's womb. This shows most wonderfully the fact of multiple teleological designs for development upon which phylogeny also relies.

26. On the other hand, though, it will be good to demonstrate that natural science, which is so highly regarded, has not in one single case proved its universal principles with precisely infinite probability. Not even the law of gravitation, indeed perhaps not even the law of inertia is established with precisely infinite probability. According to the law of large numbers, the *inductio per enumerationem simplicem* does indeed yield an ever increasing probability for each successive case. And as a result of continued observation, the probability of such an inference would become infinitely great. However, one must distinguish the conclusion in one case or even in a finite number of them from the conclusion over an infinity of new cases, which is what the formulation of a universal law involves. It is precisely according to the law of large numbers that the probability decreases in proportion as the cases on the basis of which one concludes increase. And so at this point an infinite probability, indeed perhaps actually a predominant probability is out of the question. This is why deeply probing natural scientists have arrived at the conviction that with regard to nature we can never acquire knowledge of laws, but only of facts which are to be expected to recur in the same way with great, indeed, with infinite probability. And this would be sufficient for our practical lives. If scientists were to acquire a real law with a great, even an infinite ratio of probability, then they would believe it to be a feat which surpassed all that has been achieved so far. Let us now compare this with our case, in which the question is whether something which is directly necessary is an intelligence. Here the result is not a momentary instance, but an eternal directly necessary truth which is therefore to be designated an established law. And if the conclusion really did not have exactly an infinite probability, but rather had only the probability in which the chances for and against were in a ratio of a billion or a trillion to one, then the scientific thesis regarding its certainty would appear to be quite excellent. And the fear would be ruled out that our inference could be false, and that we do not do well to take comfort in it in our thinking and to make it decisive for our feelings and for all our actions.

27. But let us see whether the probability of our conclusion is really only finite in this case. For this inquiry we must take each of the four arguments we have used into consideration separately.

The first argument rests on the fact that an infinite multiplicity is ruled out as actually existing, but the possibility of it is undeniable. This was demonstrated for material and spiritual things with the same certainty as that with which we believe in general in an external world. And on this point we may say that the whole of humanity, with negligible exceptions, would agree with us. But everything else followed with a probability for the expression of which no finite numerical proportion would suffice. So as far as this argument is concerned it is not true that its probability is only finite.

The second argument asserted that if the first, acting principle acts blindly then it must have as many parts as does that which is produced. From this it was possible to conclude that in such a case the first principle of a physical object would have to have three dimensions itself; and that the earlier proof against the direct necessity of a physical object would also declare the unacceptability of the direct necessity of such an extended principle. So in this case, too, we were not dealing with a proof of merely finite probability.

We come to the third argument. It rested on the facts that the first principle of a change or of a continual motion could not be entirely changeless itself, but that change and motion are encountered in the world of experience. Now if it followed from this that the directly necessary being itself succumbs to change, then our problem would be to show how this is to be conceivable without contradicting its direct necessity. At first the contention seems indeed to be very paradoxical, as witness the number of prominent thinkers who held the problem to be plainly unsolvable. They quite decisively advocated the view that the first, directly necessary being must be absolutely changeless. In considering the matter we found that they would be right, were it not for one exception which presents itself in which the changing being appears, amazingly, to be more consistent with itself and more constant than the being which would rule out the change in question. And this single case which comes to mind is that of a being which constantly knows the whole of history, past, present, and future. A continual change of the temporal modes of the various events must be proper to its knowledge, since each event is indeed to be known with a continually different temporal mode. So there resulted once more the conclusion that the first, directly necessary being must be one which knows. If we ask now whether this conclusion is only probable and its probability only finite, then it appears that one would not do justice to its full force if one attributed to it such a limited certainty. For it is absolutely impossible to discover how this difficult problem, which the greatest thinkers despaired of solving, should admit of any other solution than the one we've proposed. Perhaps everyone who considers the matter sufficiently shares my conviction. Otherwise it must be that they accept a new, and very impressive verification of the being whose existence has been proved by the earlier arguments.

28. There remains the fourth argument, the most popular of all, which relies upon the appearance of teleology in the world of experience.

That this appearance is immeasurably great is denied by almost no one who is acquainted with the facts. But to be immeasurably great for us is not exactly to be infinitely great. It is certainly true that if one thinks all the letters in the *Iliad* to have been scattered at random, then one would think it as good as impossible, on account of the improbability of it, that the letters would group themselves in the order in which they occur in Homer. However, the ratio of probability would still be expressed by finite numbers. We could simply emphasize, as we did similarly above, that even if an equal, or no smaller, probability could be demonstrated in favor of the appearance of teleology in nature, then the principle of the wisdom of the directly necessary being would be assured in a way which is satisfactory to our frame of mind. However, we can do more than this. The ratio of probability for the question whether the appearance of teleology is to be understood as real teleology results from the comparison of the number of equally conceivable cases which exhibit such an excellent apparent order with those which do not. If one inquires into this, the result is an infinite majority of cases of disorder. In view of this, Boltzmann claimed to have made the reason for entropy understandable, and he earned general acclaim. To be sure, his doctrine of the destruction of order by means of increasing accidents stands in remarkable opposition to Darwin's contention. According to Darwin, the increasing accidents, in a certain sphere at least, would lead with the highest probability to the construction of an ever more perfect order. However, we already stated the misgivings to which the Darwinian hypothesis is subject, and in addition to this how great the appearance of teleology is in certain of his indispensable presuppositions. If the accidents really had the result that, instead of the infinite probability of the destruction of every appearance of order which Boltzmann demonstrates, a building up of such an appearance would occur with infinite, or even with only finite, probability, then the accidents would themselves not be attributable, without infinite improbability, to anything other than a purposeful order.

29. Another objection could appear to be more embarrassing. It has been pointed out that what would be expected only with an infinitely small probability in a finite time could occur with an infinitely greater probability in an infinite time. And so, under the assumption that the world exists without a beginning, one need no longer be amazed at those apparently astonishing cases of perfect teleology. First of all, however, there is the infinite probability of different orders. And secondly, when one considers that what are in question are orders which exist in three-dimensional space, one easily recognizes that the appeal to an infinite, one-dimensional time would not suffice to raise a probability which was infinitely small to one which is infinitely great.

And besides, it is clear that if the transition from disorder to apparent order were to take place from time to time without a purposeful order, this would happen incomparably more easily and more often in small parts and over short periods than in large parts and over long periods. So the fact that we live in a period of exceptionless entropy would no longer be explained by Boltzmann's theory.

30. This general observation can be more fully expressed by going into details. So it is, for example, if one compares the probability--if space is infinite in each of its three dimensions--that even just two particles of matter be in such a situation relative to one another as to be able to exercise an influence over one another. It is infinitely many times infinitely improbable that even just two particles be together, or if each is in motion that their paths intersect, and if their paths should intersect that the particles would meet at the intersection. One could attempt to refute the demonstration just produced only by virtue of a view foreign to our natural scientists, according to which a uniform, extended substance underlies physical processes which are its accidents,[52] and these as a result undergo a change at the boundary of the substance. However, considered carefully, the attempt would prove to be unsuccessful. For the uniform substance which underlies the accidents would have to be considered to be a multiplicity upon which every unity would depend for its existence. And the contact of all these unities would exhibit the same improbability which had resulted earlier for the coming into contact of different particles.

Let us especially mention yet one other point. Maxwell, who spoke from the atomist viewpoint, called special attention to the fact that all atoms of an element appear as though cast from the same mold. One easily recognizes that such a high degree of agreement, even of only two atoms, must appear *a priori* to be infinitely improbable. But this agreement is apparently highly teleological, since without such an infinite, harmonious material the prerequisite of the organic world would be missing. But if one rejects atomism one thus deprives oneself of the possibility of conceiving of the doctrine of chemical equivalences as necessary. And the regularity of the entire physical world which is given in this doctrine then appears again as one case against infinitely many which are equally conceivable. And on this showing the regularity which really exists is the apparently amazing teleological regularity.

31. Thus one could go still further into the details, and always a new ratio of probability would result which could not be understood as a finite one. But in the two points which I have discussed, I have only mentioned what is common to the inorganic and organic worlds, whereas the special appearances of the organic realm exhibit teleology so much more remarkably that, as I already said, Kant himself was able to see such teleology only there. In the organic realm one encounters the coordination of the unconscious with the conscious, which seemed to Locke to be so unbelievable, unless it were traced back to a conscious origin, that

he saw in the fact of mind the most irrefutable proof for the assumption that a divine mind exists.[53]

After all that has been said, we certainly have proved with a more than finite probability that the first directly necessary being must be regarded as a knowing principle.

And it agrees very well with this that the first, directly necessary being cannot be thought to be extended, as has become apparent, since it is possible to demonstrate that our minds are also not extended. We are indeed restricted in our thinking by bodily organs. However, no bodily organ is the subject of our thinking. On the contrary, this subject must be one and the same for our whole thinking; whereas the bodily organs which serve it do so in very different ways, so that a disturbance which enters in by one organ and by another makes itself noticeable in quite different ways. The directly necessary being naturally has need of no organs, since indeed as directly necessary it is absolutely unrestricted.

V. The Contrast Between the Original Intelligence and All Embodied Minds

32. From what has been said it appears not only that there exists an intelligence as the first directly necessary principle (of which we have no direct experience), but also that there is a contrast and a disparity between it and every intelligence which experience discloses. The original intelligence is directly necessary, the embodied ones only indirectly so. The former has the power to make something without any further condition; the latter require a subject which accepts their activity or which is transformed by it, without the amount of real things being thereby increased. The original intelligence is, if not without change, still changing only in such a way that the change never brings it into contradiction with itself, but rather maintains it in full harmony with itself. The embodied minds, the other hand, vary between ignorance and knowledge, error and understanding, habitual and actual thinking. For the original intelligence, then, change is also infinitesimal and uniform and takes place without any cause, since the direct necessity endures uniformly. But change in the embodied minds is sometimes larger, sometimes smaller, and exhibits no alteration without a cause. For the original intelligence, a moment of diminished, or indeed of totally lapsed actual thinking is an absurdity. But the embodied minds, despite all that Descartes maintained, can be thought of as being in a state of total unconsciousness.[54]

33. If we ask, in view of this, whether it is possible to speak of a compound of substance and accident with regard to the original intelligence--similarly as is done with regard to the mind which we know

by direct experience--then the question is to be answered negatively. In order to make this indubitable, we must think what the criterion is for whether a determination is to be looked upon as substantial or accidental. Among substantial determinations is every one without which a thing absolutely could not exist. And so it is, then, that just as surely as material substance cannot be without spatial extension, so extension and localization are substantial determinations of matter. But this is self-evident not only in general, but also in particular, since indeed a universal, as a universal, is unthinkable in reality. And so when we find that a body moves itself with respect to place, then in opposition to the usual opinion, we must regard the change which it experiences not as a merely accidental change, but as a substantial one. Other changes which it undergoes could rather be understood to be merely accidental when, insofar as they are connected by local transmission, they also are to be construed not as a displacement of substance but as a transfer of accidental modifications from substance to adjacent substance.[55] Likewise, our thinking and willing appear to be accidental, just as surely as the soul, can survive without them. On the other hand, the same criterion leads us to recognize that, for the directly necessary intelligence, thinking belongs among its substantial determinations. Indeed, it absolutely cannot lapse. The steady, infinitesimal change in the thinking of the directly necessary intelligence is thus a substantial change.

34. Also, still another consideration serves as confirmation of this conclusion. The thinking of the directly necessary principle is supposed to make understandable, in the diversity it exhibits, the variety of created things, and, in the order it exhibits, the purposeful order of the world. But if this thinking were accidental, then something else would appear to be prior and solely uncaused, namely the substance--which indeed, as such, would not then include an order. Every substance appears to be the cause of the accidents which inhabit it. And thus the directly necessary principle would be seen in this prior substance, and so it would be such that, as truly as it is not a thinking thing, so it is lacking in what we have just demonstrated to be the necessary unity of the directly necessary principle.[56]

35. We also recognize that the directly necessary intelligence must be perfectly impassible. It cannot suffer in its substance because then it would be, as caused, not directly but indirectly necessary. And it cannot be modified accidentally by a cause, because it has no accidents. Rather, all the determinations which it possesses, including thinking and willing, must be designated substantial.

VI. The Directly Necessary Principle is One

36.In deciding this question another one is raised, namely that of whether the directly necessary intelligence is to be regarded as one, single mind, and as the only directly necessary principle. It is easy to see that nothing compels us to assume a multiplicity of such principles. And we could already be inclined to deny such a multiplicity according to the principle, *entia non sunt multiplicanda praeter necessitatem* [entities are not to be multiplied beyond necessity]. But there are stronger arguments at our disposal. Above all it is clear that if there is a second directly necessary being it must be different from the other one. For according to the *principium identitatis indiscernibilium* [principle of the identity of indiscernibles] there cannot be a multiplicity without a difference. How are we to think of this second directly necessary being, then? As an intelligence which thinks, and wills--and actively strives for--other things? But then its activity would not affect the other directly necessary being, since, what with their mutual impassibility, communication between the two is ruled out. And for the same reason, there can be assumed to exist, in addition to the one directly necessary intelligence, no directly necessary principle which acts blindly, nor thus in general any directly necessary active principle. So there only remains to be considered, as a second directly necessary being, one which exercises no effect whatsoever. I think that no one will regard this assumption as in any way worthy to be taken into consideration, since an absolute powerlessness, not being possessed even by any of the merely indirectly necessary beings, may be attributed even less to a directly necessary one.

Also, the directly necessary intelligence must have knowledge of it, if there are either intelligent or non-intelligent directly necessary beings in addition to it. For otherwise even its knowledge of the achievement of its purposes would be impossible. Naturally, it would have this knowledge *a priori*, on the basis of simple presentation [*blosser Vorstellung*], but without this presentation being grounded, along with the extent of its power, in the knowledge of itself--which nevertheless seems to be required. And this knowledge, even if it is of the entirely inactive directly necessary being, can neither be attributed to nor denied of the directly necessary intelligence without absurdity.

VII. The infinite Perfection of Its Knowledge and Love

37. It would thus be proved that the directly necessary principle is a single, intelligent being, and it is easy to see that it must be thought of as an infinitely perfect intelligence. Its knowledge is all-inclusive and faultless, and encompasses the entire past and future, even though these have no boundaries.[57] It knows what is directly true and necessary with direct insight; and it knows what is indirectly necessary through its first

cause, which is the most perfect way of knowing. If one compares its knowledge with human knowledge, then the infinite disparity appears even on a particular point; as, for example, it is impossible for us to determine the relation of a square to a circle except approximately. No one can predict with complete accuracy what shape a cloud of smoke will assume in a second. But the first intelligence knows this and every other further development with complete accuracy, unto the most distant times.

38. But another question remains to be inquired into, namely that of whether there must be attributed to the first intelligence not only the highest perfection of knowledge of the truth but also the highest perfection of love of the good.

It is beyond doubt that it possesses loving and willing as well as thinking, since indeed otherwise no intelligent activity nor purposeful order could be traced back to it. But that a being which is infinitely perfect in its understanding should be imperfect in its feeling may already appear *a priori* to be an impossible assumption. And the more one considers it, the more one will be strengthened in this conviction. Just as the first mind knows everything else, so it also knows what is good and evil, and no priority of the better over the less good is concealed from it. If it were to prefer the less good to what is better, when it knows better, then this would be a disharmony. Its own judgment would condemn it. The knowledge that something is better is a motive to prefer it. And without an obscuration of this knowledge one cannot arrive at an opposing preference. For us, such an obscuration is possible, as in a state of passion; for the infinitely intelligent being it is not possible. If we ask what leads us to incorrect preference, it is apparent that disproportionate self-love, passion, and bad habits are the causes. But it is clear that none of this applies to the first principle. It cannot lose nor gain anything. Passion is no more proper to it than is instinctive, blind judgment; and no more can a habit develop in it. It has made us such that we never prefer what is bad without the influence of error or ignorance. But it is itself necessarily such that, in view of the knowledge of what is better, every preference for the less good is ruled out.

VIII. Omnipotence and Felicity of the Creative Intelligence

39. Thus it would be proved that the first principle is not only all-knowing--and that in the most perfect way, namely knowing all things by their first causes--but also that it is entirely good, and in its love prefers everything according to its true value. But it cannot be doubted that it is also to be called omnipotent. Naturally this means more than that it infinitely surpasses us in power, since even an infinite being could appear smaller--indeed infinitely smaller--compared to another infinite being. And also, this would not yet justify us in calling the first principle of the

world omnipotent if, although it included in its power all that really lies in the power of another thing, still something which in itself is unthinkable without absurdity were to fall outside the sphere of its power. However, nothing is easier to show than that this too, is entirely unthinkable. But it is clear that, since nothing can be nor become independently of the first principle (indeed the thought that something exists without being caused by it is ruled out *a priori*), therefore its power extends to everything the existence of which can be assumed without absurdity . The sphere of what is possible for the first principle coincides altogether with the sphere of what is logically possible.

To be sure, this has not always been correctly stated, since only what contains a contradiction has been reckoned to be logically impossible. In that case, positive oppositions could be thought to be reconciled without any violation of logic; and a yet wider specification could fall under a species like red. Indeed, even the non-existence of the first principle would also be something that would be logically possible since, as Hume (and after him, Kant) aptly says, this contains no contradiction. Therefore, at this point the concept of the logically possible must be reformed in such a way that, like the absurdity of the union of contradictory determinations, every other absurdity is taken into account

40. With the demonstration, then, that like the infinite perfection of knowledge and love the infinite perfection of power is also proper to the first principle, its infinite felicity is established, too, beyond a doubt. But joy depends upon the ability to unite with one's love the consciousness of the reality of what one loves. And this can be done to the fullest degree by the first principle, which knows itself and all things outside it to be realized in correspondence with its love. So Aristotle could rightly say that it is comparable to us as we are in the best and most blessed moments of our lives; but, of course, it is comparable not as a being of equal value, but as an infinitely superior one.

PART THREE: CONCERNING THEODICY

41. But, obvious as it is that the first principle is infinitely perfect in knowledge, love, power, and thus in happiness, still the fact that the world is filled with evil seems to stand in the way of this conclusion. We encounter suffering, error and ignorance and abominable crimes. Also, pain and pleasure do not seem to be distributed in accord with justice. It is often pointed out that the number of virtuous people is relatively small; and many maintain that there are many more pains than pleasures in this life. Indeed, this is held not only to follow inductively, but also to be established by the fact that the pleasant is nothing more than the absence of the unpleasant. To be sure, this latter contention is thoroughly opposed

to experience. But that the pains of life outnumber its pleasures seems plausible, when one considers that, in terms of intensity, it is much easier to produce the greatest pains than the greatest pleasures. But aside from this, it is maintained that if there is any suffering, or any immoral act, or any mental illness or even misdirection in the world, then it is unthinkable that this is the best world. And therefore, the world cannot be thought to be the work of a being whose power is infinite, who knows all things, and who absolutely prefers the greater to the lesser good.

42. But it is widely recognized, even by thinkers who do not consider the existence of an infinitely perfect principle to be proved (and in fact, by the most eminent among them) that this objection is not valid. Thus David Hume states quite emphatically that if the existence of such a perfect being were actually proved, then no reference to what appears to us to be a dysteleology could dissuade us from the proof, since it would be clear from the outset that our understanding is not capable of knowing the particular determinations of an infinitely higher understanding. Kant was as unwilling as Hume to grant true cogency to the attempt to prove the existence of God. But he also found that there is nothing in the world which could be called incompatible with the assumption there is a divine being.

43. In addition to Hume's general thoughts on the subject, the following remarks might serve to make this clearer.

i. There are two senses in which a thing may be said to be good. It may be good insofar as it is good in itself, and it may be good insofar as it is a useful means to something else. We do not hesitate to diminish the intrinsic value of a thing in order to make it more useful. And so there can be cases in which even a thing which is bad in itself appears to be preferable to a thing which is good in itself because it exceeds this in usefulness. At times a prison sentence is better than setting someone free; and at times the pain of a spanking is better than granting a little heart's desire. Thus even if there are thousands of things in the world which are intrinsically evil, still there is nothing which cannot be shown to be fully justifiable on account of its predominating usefulness when its connection with the world as a whole is discerned.

ii. If we find not only pleasure but also pain in the world, then this can easily be understood as promoting progressive development. Pleasure has an effective attracting power, pain an effective repelling power; and it is clear that the availability of both must be more effective than either taken alone would be.

iii. If this is the best of all possible worlds, it can only be so if it is thought of as infinitely improving. Then it may surpass every conceivable level of perfection. Anyone who beholds the world as it is presently, beholds something which is incomparably inferior to what God has preferred as that which is in itself the best possible. Only when we look back at even earlier stages of its development does the present state of the world appear to be relatively superior. But this also is incomparably closer to the previous imperfect stages than it is to those which are to be expected. It is precisely this progressive development to ever higher and higher levels which allows the work of God to appear so especially wondrous in all its parts.

iv. If we find that people are ignorant, and err, and make all kinds of moral mistakes, this is just what follows from the fact that, as with the macrocosm, so with the human microcosm: things are not complete from the beginning, but rather they reach higher perfection by means of progressive development. Virtue must be earned, and this is the very reason why it is not all there from the beginning. And so deeds are done which fall short of our standard. But even the development of virtue through education and self-improvment is a good in itself.

44. David Hume, in searching for the sources of evil in the world, believed he found that they could be traced back to a three-fold cause. The first is that all things proceed from general laws, so that what is needed in a particular case cannot be taken into consideration all by itself. The second is that nature is frugal in the employment of means. And the third is that it seems sometimes an excess and sometimes a defect is bestowed. If one considers the first and second causes, then it is easy to recognize an apparent short-coming as a great advantage. What would become of our knowledge if there were no general facts? And likewise, the solution of a problem appears to be most admirable if it takes the least number of intermediate steps to reach its end. But as far as the third cause is concerned--the exceeding or falling short of the right proportion--it is clear that he alone can judge of excess and defect who knows all the considerations which are possible with regard to the particular proportion. It is precisely in the most perfect ordering of the world that everything stands in some relation to the end, so that excess and defect can be determined with certainty, not in consideration of the nearest thing alone, but only in consideration of all things and of each thing however far removed. The standard of measurement is not available to us, so how can we measure?

45. In order to show that the objections against the goodness of the order of the world are powerless, we have repeatedly made reference to the future. And naturally we must also do so when the fact is appealed to that

the distribution of pain and pleasure, as it now stands, seems to be very little in accord with justice. But since there is a future which has no end, and since it can be shown that our soul is itself something independent of the continued existence of the body, such that its death is not implied by that of the body, there is not the least difficulty in thinking that the longing for a just reward will be satisfied in another life.

46. Nevertheless, it is held that the experiences we have must determine what is to be expected hereafter. And thus, if justice appears to be offended here, then there is also no hope of a just distribution of pain and pleasure in the next life. And something similar would hold for every other vain promise that things will be better in the life to come. However, if the construction of the world by the creative understanding is to be compared somehow with what is constructed and exhibits nature in an organism, and with what a human art produces, then the analogy clearly supports the idea that preparatory stages must be passed through which contain little or nothing that is good in itself (although the end for which these are ordered is good in itself). Hume said that, of course, one could see a house in the process of being built, but still uninhabitable, and conclude that it will be habitable at some time. But this is possible only because one has already seen other houses successfully become habitable. And thus, on the basis of our experience of the world, we would be able to conclude that future circumstances will be more satisfying only if we have already experienced the course of development of other worlds and found that in those cases such improvement has occurred. But here Hume overlooks the fact that an argument by analogy can be used not only within the narrow boundaries of a class, but also quite convincingly among things which are only generally related. Cuvier found animal skeletons which differed vastly from those of animals living today; and yet his arguments by analogy for the structure and functioning of those animals were of great consequence. And so such arguments can be of use in our case, too. For we had demonstrated, step by step, that the being which is directly necessary is perfect, and that such a being cannot be thought of except as knowing all things most perfectly and as evaluating all things correctly. And from this the conclusion that the ordering of the world is the best possible followed with full force, and so did the conclusion that development is endless and progresses to ever higher stages, such that what is missing in earlier ones is actualized in the course of later ones.

47. There are also many who acknowledge the immortality of the human soul, but are not likewise inclined to grant this to the souls of animals. And for this reason they are tempted to reproach the ordering power of the world for a defect in its goodness, on account of the pains which such a great number of animals undergo. Now, comparative

zoological studies have proved that in comparison with human beings animals are by far more sensitive to physical pleasure and by far less sensitive to physical pain. But apart from this, the view that immortality is not to be granted to animal souls, as distinct from human souls, is untenable. Anyone who does not go along with certain Cartesians in completely denying soul to animals and taking them for mere machines, will consider animal souls imperishable, too, as Leibniz did.

48. However, what I have said about the difference between men and animals regarding the relative degrees of physical pain and pleasure could appear to be a new paradox. A man is to be valued more highly than an animal, so why should Providence have dealt so much less lovingly with him? But this apparent absurdity is easily explainable upon consideration of the characteristically higher purpose of human beings. Even with the more limited capacity the human species has for physical enjoyments, it is apparent that many, who are capable of them to a higher degree than are others, are satiated by them and do not devote themselves to a more intellectual life. How would it be if the physical enjoyments were even more intensified? If the limited degree of pleasure is understood in this way, then the greater degree of pain is also understandable. Pleasure and pain are our instinctual motivations; and the less intensely the one moves us, the more it falls to the other to take its place as a moving force.

49. Thus, careful considerations could solve many another puzzle of teleology. But the great majority have quite remarkably lacked the requisite caution. And so it is that a half-ludicrous and half-shocking criticism of teleology has been made, not only by a Vogt with respect to the wonderful structure of the eye. But also a Littré dares to compare the teleology of the reproductive instinct with a rabid dog's urge to bite. And Albert Lange left himself open to attack in his attempt to demonstrate that the apparent teleology in the works of nature is incomparably inferior to that of human works of art.

50. Those who do not recognize that the beauty and order of nature show it to be the work of an intelligence are described by Aristotle as people who chatter on without reflecting at all. And Locke and Leibniz were still of the view that the proof of the existence of God is easily understood and perfectly certain. But already in Clarke[58] we encounter mistaken notions which could be called the forerunners of a more far-reaching deviation from the truth. And this was subsequently brought to completion, partly by Hume and partly by Kant who was strongly influenced by Hume, as everyone knows, and also by Clarke, as is less well-known. That is to say, Clarke thought the only sufficient proof of God's existence to be that which is an empty paralogism, namely, the

ontological argument. His reason was that the teleology of the world, endless as it is, could never suffice to make it known that an infinitely perfect cause is its necessary presupposition. Kant took this from Clarke, and from Hume he got the demonstration that the ontological argument is a paralogism. But there is a lot missing from Kant's exposition of the proof of God's existence, as he gives it, which, upon comparison with the examinations we have made, could render the proof unobjectionable. And yet, without fearing to be reproached for arrogance, Kant dares to forbid every attempt at another line of argument for this important doctrine. And the world, which really sees in Kant the ideal philosopher, has so little resented this disparaging judgment of his that to this day it is repeated after him in his honor. Moreover, in his formulation of synthetic *a priori* cognitions, Kant conveyed more particular misgivings about the possibility of proving God's existence, which had to do with the limitation of the validity of such cognitions to the realm of phenomena. But his misgivings amount to nothing when one discovers that the *entire* doctrine is untenable: that is, both the doctrine that synthetic *a priori* cognitions are the indispensable foundation of all science but lack the power to judge of things in themselves, and also the doctrine that it is impossible to achieve any truth beyond the phenomenal. Kant was no pioneer of successful philosophical inquiry. The fact that directly after him philosophy deteriorated and was led into the most monstrous absurdities serves as vivid proof of this. He himself was already a manifestation of the decline; and like Reid and by analogously unnatural means, he sought to overcome the skepticism which had preceded him. The end was laudable, but the means were so misguided that they in turn intensified the prevailing abuses. Anyone who recognizes this will not turn to Kant for the proof of God's existence nor for the solutions of other problems. But he will look to the philosophers of the time when philosophy flourished, in whom he finds valuable contributions which can be brought to higher perfection by new and more precise inquiries.

51. It was already recognized long ago that the doctrine of God's existence necessarily involves the doctrine of the best of all possible worlds. Aristotle taught this most clearly and emphatically. So Leibniz was hardly the first or only one to express this idea as, among others, Hume maintained.* Neither Leibniz nor Aristotle ignored the undeniable evil of the world, and indeed we have seen that it does not suffice to refute the doctrine anyhow. Every case of generation appears to be one of corruption at the same time; and actuality is always bound up with privation when many possibilities are available, some things being

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* When other theists, e.g. Thomas Aquinas, deny that the world is the best possible, or that it could be such, what they mean is that in order to be the best it would have to be a flawless example of its kind. Similarly, among the works of a great artist one might have a

deprived of lower uses, others of higher ones or of the highest. For otherwise the whole diversity of the structure would be useless. And this is enough to explain what makes it appear that something less good has been preferred to what is better a thousand times over--until one enlarges the range of one's ideas.

52. Those cases seem to be more difficult in which something seems to have been preferred to another thing which is of equal value. Such a case arises, for example, in the comparison of the spatial world with its mirror image, a case into which Aristotle inquired without success. Also there are difficulties with the question, at what point in time the world must have begun to exist in order to be the best of all possible worlds. This misled Leibniz into maintaining the absurd idea that one can differentiate only between a world which has a beginning and one which does not, but not between worlds which begin at different points in time. In solving these problems one must remember that, just as when differences are clearly involved, so also when our understanding cannot differentiate between the lesser and the greater good, it is always possible for the infinite understanding so to differentiate. But then, it seems that one must also notice that, like any conceivable world, the best of all possible worlds is not the totality of all existence, since this rather includes God himself. And so it can be thought of as the best possible world only in the sense of being preferred to all others. For the world is good along with the existence of God; but taken in isolation it does not yield the good in itself, nor is it as such unequalled by any other world. It might be that the good in itself is greater because the world has a beginning, and that the world

higher purpose than another, but still each could appear flawless in its own kind. It would be odd, then, if the analogy could not be carried further so that one could maintain that God does not limit Himself to the creation of one world but, like any other artist, he may create many worlds, each perfect in its own kind. This idea is rejected because the unified ordering of all things seems to be preferable to the complete isolation of one part of creation from another. But in saying this has the principle not been appealed to that the first Principle must always prefer what is intrinsically preferable, which result, once established, leads again to optimism? Indeed, must it not be affirmed that the whole composed of many worlds perfect in their own kinds is a greater good than is each of its parts? -- Consistency is often violated on this point. One thinker who is as guilty of this as any other holds a peculiar position midway between the strictly optimistic theists, like Aristotle and Leibniz, and those who disavow optimism, like Thomas Aquinas. Suarez ventures to maintain that, even though the world need not be absolutely the best of all possible worlds, still it must contain some specimen of every possible kind and arrangement of goods. He even holds that if one could understand, with a mere natural intelligence, that the union of a created with a divine nature in one person is possible, then one could also understand, with a mere natural intelligence, that such a union of the creator and the created actually comes to pass at some time in the history of the world. These remarks serve as a clear indication that, despite all the disagreement about the strictly optimistic position, still this position must be considered consistent from a theistic standpoint.

more clearly reveals its relation to God as the infinitely greater good (which doesn't really need the world) than it would do if it had been created without a beginning. And from such a point of view, to which still others could be added, it might be conceivable that the choice of a later point in time is better than is that of an earlier one for the beginning of the world. This could be so even if the development of things would otherwise be equal and the choice of an earlier starting time would make the order of the world farther advanced at each moment.

53. It is undeniable that much remains obscure for the theist. But this is no less so for the atheist, and he must accept in addition the absurdity with which his doctrine is afflicted. However, it is only this absurdity which is absolutely unacceptable, whereas the obscurity is just what must be expected of our infinitely inferior mind when it tries to understand the work of an infinitely superior one.

EDITOR'S FOREWORD TO THE GERMAN EDITION

When an admirer of Leibniz once praised him for his mathematical discoveries, the philosopher demurred saying that the study of mathematics was not important to him for its own sake, but rather on account of the help he hoped to get from it for formulating the proof of God's existence. So Leibniz may have regarded mathematics above all as the universal discipline of mental acuity and precise thought, but his hopes have been fulfilled in yet another way. It is the mathematicians whom we have to thank for illuminating the procedure by which the human mind infers hidden causes from given facts and universal laws from particulars. In the formulation of probability theory,scientific induction appears to be justified. It wasn't Kant who solved the Humean problem, but Laplace.

Philosophers, influenced in their epistemologies for a century by the *Critique of Pure Reason,* have long misunderstood the service provided to them by mathematics in the investigation into external causes, and thus naturally also in the investigation into the first cause. And since the world outlook of the educated conforms to the reigning philosophy, indeed outlasts it for a period of time, according to the law of custom, people today still harbor misgivings about metaphysics generally and are inclined to shove aside as *passé* a work that promises to prove the existence of God. But the educated will once again have to go along with the transition which has spread throughout science.

In his *Versuch über die Erkenntnis,* Franz Brentano showed that the objection Kant raised against any renewed attempt to prove the existence of God is entirely unjustified, and he thereby cleared the way again for a scientific approach to God. So one may once more fearlessly choose the path by which the genuinely classical philosophers, from Aristotle to Leibniz, sought to approach the most sublime goal of philosophical investigation. Yet the continuation in their way must proceed with a genuinely critical spirit, in the sense of a selection of what is valuable and a further formation of what is capable of development.

How much Brentano found to change in the attempts of his great predecessors the reader of this volume will most readily see if he begins his study with the concluding article, "The Train of Thought in the Proof of God's Existence." Produced two years before Brentano's death, it contains his thoughts on the problem of all problems in their most mature form.

All the themes of the proofs that were carried out separately elsewhere appear united there in a unified demonstration. The edifice is raised by several stages. The foundation is formed by the so-called proof from contingency. That the universe is neither accidental nor directly necessary is demonstrated with an original proof for each part. The principle that chance is out of the question appears as an analytic proposition. Chance and existence yield a contradiction, as surely as the former works against the continuity which the latter requires. But the physical world also cannot be directly necessary, because at each time it must have a determinate degree of extension, yet it can never have one which is by nature unexceedable, since a completely infinite extension appears to be absurd.

Brentano's demonstration that the so-called law of universal causation underlies the principle of the impossibility of chance, and that the latter is analytic, will undoubtedly attract more and more attention. Whoever suspects a mistake in it, let him expose it in the same rigorous way as it is presented to us in Brentano's argumentation. To continue to content ourselves with regarding the law of causation as a "postulate," as a blind *a priori* presupposition, signals the bankruptcy of epistemology.

The proof from contingency leads to the recognition of a directly necessary, transcendent, creative principle.

That this cannot be thought to be other than an intelligence is shown in four ways, three of which are new ways, whereby among others the ancient opinion that the directly necessary being must be thought to be absolutely changeless is pointed out as an error. Brentano calls attention to a change which, so far from bringing the necessary being in contradiction with itself, is rather indispensable for keeping it in harmony with itself. With this he reaps, in the heights of metaphysics, a fruit of his psychological analyses of our conception of time. The fourth argument for the creative intelligence is the teleological argument, which appears like a new construction in Brentano.

The way the argument then moves from the creative intelligence to the unity and infinite perfection of the first principle, departs significantly from the corresponding part of the lecture. It is a matter not merely of completion and correction but of entirely new arguments.

While the teleological argument is only sketched in the "Train of Thought," in the large lecture it is handled in great detail.

A great step forward is signified above all by the sharp distinction of two theses: The statement that everywhere in the world there is an appearance of teleology; and the hypothesis explaining this matter of fact, that this teleological character rests on really purposeful ordering. Whoever would begin the teleological proof, as often happens, with the alleged fact of a purposeful ordering, lays himself open not only to the objection of anthropomorphism, briefly raised again by Driesch, but also to the much more serious charge of presupposing what is to be proved.

The treatment, too, of each of the two questions shows a wealth of original strokes. As for the first question, those who know the problem will immediately notice to what a high degree the realm of inanimate nature--almost entirely neglected by the teleologists--comes into its own in Brentano.

At the time when his draft appeared, the facts about animate nature, in which Brentano demonstrates an overwhelming appearance of teleology, were under attack in many ways from this point of view. Teleophobia was an infectious disease, to which we have become fairly immune. The ability to discern the appearance of purposeful ordering has improved significantly. Work in this area has become not only more extensive but also more intensive. This finds expression especially in the fact that the teleological character of organic nature is not traced, as in previous years, predominantly in the evolution of species but rather in the wonderful processes of seed development, a realm in which, as Brentano knew from the very beginning, the peculiar puzzles of teleology lie. In this sense Driesch, too, makes it his plan to proceed in the opposite direction from his predecessors. "Ordinary biological discussions," he says, "tended always to proceed from the theory of evolution and all the other problems of structural physiology were handled along the way as matters of lesser importance." In his *Philosophie des Organischen,* evolution comes at the end, but the morphogenesis of the individual gets a very thorough and careful presentation. The advantage achieved thereby in handling the teleological problem consists in the fact that the fundamental phenomena of ontogenetic development can be grasped by experiment and are extraordinarily vivid. It can be said that by works such as that of Driesch on the first part of our question, i.e., on establishing the fact that there is an appearance of teleology in animate nature, examples are produced which are highly significant and very convincing. Thus Driesch is in a position to attach the following thesis directly to the results of modern experimental investigations into the processes of germination: Here everything looks as though, in order to reach a certain goal--the formation of an individual of the appropriate species--the rule of physical and chemical laws within a collection of small material parts is held under the control of supernatural factors not belonging to this system itself, and likewise certain tendencies which are included within the system are held in check. The fact that here there is an appearance of purposeful ordering can hardly be more impressively formulated than it is by Driesch.

Perhaps someone will find it strange that I see the essential fruits of *Philosophie des Organischen* in the contribution it makes to establishing the appearance of teleology, whereas it would claim rather to offer an explanation of this.

Now I must of course confess that I do not find such an explanation given in the achievements of modern vitalism. When Driesch says that the processes in seeds, e.g., the amazing regulations by arbitrarily disturbed development, are "controlled" by an external factor, he does not venture to be serious about it and call this factor a psychic one. Indeed he rejects that outright because he does not consider it appropriate to apply concepts derived from inner experience to processes of external nature. Since this would undoubtedly be the case for the concept of controlling, it is thus a matter of a controlling which is not a controlling. And what remains then, to speak precisely, but our modest preliminary thesis that everything is arranged as though there were such an ordering, i.e., just the thesis that there is an appearance of purposeful ordering here?

Of course, Driesch does not want to speak of teleology in nature at all, but rather in order to avoid such a psychological concept he prefers to speak of wholes and of relatedness to the whole, which seems to be obviously more careful and more noncommittal. But on the other hand he does not shy away from the claim that he perceives such wholes directly in external nature. This concept of relatedness to the whole would rest entirely on empirical objectivity (i.e., it would be taken from the realm of external experience).

I take this perception to be self-deceiving. The "whole" which is meant here does not consist in the mere uniting of a multiplicity within a sensible contour or intuitively given temporal boundary, but rather it consists in the fact that a given collocation of things and succession of processes suggests to us the intelligent government of beings which, because they strive after one thing as their goal, choose a variety of other things and put them to work as means to it. But these are undoubtedly concepts whose origin in inner experience cannot disprove a fresh terminus but can only obscure it.

Therefore the claim that such wholes are really given to be perceived directly in nature seems to me in fact to have anticipated what would first be proved by a confrontation of the hypothesis of their actual existence with the hypothesis that it is a matter of a mere appearance of such relatedness.

On the other hand, the attempt to apply concepts we have taken from the psychological realm hypothetically to things outside of it is not at all to be condemned *a priori*. Otherwise we would have to prevent ourselves from speaking of cause and effect in external nature, for we have originally taken these concepts, too, from the realm of inner experience.

So I think I do not go wrong in standing by the view that this neovitalism does not give us a proper explanation of the fact that there is an appearance of teleology, but that it does offer highly convincing material to guarantee it is a fact. That these facts, presented in the "as though" form, appear to be especially impressively formulated, does not yet make of the fiction a serious hypothesis.

Whereas material flows every year and every hour, because of new discoveries in the sciences, to the first part of the teleological proof which deals with the "appearance of teleology," perhaps little remains to the completion of the second part which mentions the hypotheses that offer themselves as explanations of that fact and which tests their relative probability.

First of all, anyone who holds to logic will have to concede to Brentano that besides the three hypotheses distinguished by him no fourth is possible. For either there actually is a purposeful ordering, or else the appearance is deceiving. The former implies the hypothesis of an intelligence; but the realization of the mere appearance could only be the result either of blind necessity or of the most astonishing chance.

What remains of the attempts at explanation which are offered is either afflicted with internal contradictions (as is Pantheism, which tries to identify with a third being things which are not identical with each other), or it is already included in the three hypotheses named.

I have already suggested that vitalism in particular cannot compete with them. In order to make this clearer, consider whether there should be assumed to be as many controlling factors ("entelechies") as there are organisms, or just a single one, the original entelechy. The first assumption would not explain the appearance of purposeful ordering but would only reinforce it because these many entelechies would know nothing of each other or of the whole, and yet they would work together with wonderful precision on their unified construction. But the second assumption, which Driesch himself occasionally suggests as a possibility, is nothing but an unusual way of expressing the hypothesis of an intelligence. Only thus understood is the revival of the doctrine of entelechies free of fictions, and thus it was intended by Aristotle, too.

So there really is no conceivable fourth hypothesis; indeed Brentano succeeds in demonstrating that actually only two of them--chance and intelligence--come into question since the so-called hypothesis of blind necessity has to take concealed loans from these two. And he connects with it an hypothesis which aroused the educated at the time more than any scientific theory had ever done before, to the point that one's position on it became a criterion of one's world view. At issue was Darwin's theory of selection by means of the struggle for existence. Brentano entered into the discussion with an important distinction: the theory of evolution and Darwinism should not be confused with each other. The former is certain, independently of whether the Darwinian attempt at explanation succeeded or not. Now with respect to this latter, Brentano does not at all mean to dispute that, among the factors which contributed to the development of species, the ones emphasized by Darwin play a role. What he comes out against is the illusion that Darwin's hypothesis presents a genuine form of the hypothesis of blind necessity. Of course, if it were such, one could not devise a simpler one. But for that very reason the hypothesis of blind necessity collapses with it. For it cannot make intelligible even the generation of new organs, still less the perfection of those already developed, without there remaining the appearance of a teleology in the original structure infinitely surpassing all human intellectual faculties and art.

People have not been blind to the insufficiency of Darwinism for quite some time now, but it can hardly have been more convincingly or more accessibly presented anywhere than it is in this lecture by Brentano. And since precisely this famous theory has made atheists of so many, it is very much to be regretted that Brentano did not enter into the campaign against materialism half a century ago by publishing his critique as well as presenting it in lectures. Many hundreds of his students owe to him the preservation of their belief in God and the protection from that materialistic, secular religion whose fanatical prophets have promised the world a heaven on earth and have begun the implementation of it by turning a huge empire into a hell on earth.

In the large lecture the teleological proof comes first. It is followed by the proof based on the beginning of motion, the proof based on the contingency of the world, and the psychological proof based on the spirituality of the soul, all taken as independent arguments none of which may be verified by the others no matter how welcome that might be from a practical point of view on account of the varied receptivity of the human intellect.

Each of these proofs is connected with earlier attempts, nearly all of which go back to Aristotle, but in essence they are carried out in an original way.

Even the fact that the proof from motion becomes a proof based on the beginning of motion distances it from the Aristotelian proof, and the way this beginning is demonstrated is new, too, especially in the first part where it is inferred from the law of entropy. Brentano had already drawn this inference in the year 1868, since when it has often been repeated. Just as achievements of modern physics are called upon here for solving the most sublime metaphysical problems, so the results of cerebral physiology are used in the psychological proof where there appears the surprising fact that precisely the absence of an unpaired seat of the soul (the presence of which seemed to earlier philosophers to be indispensable for demonstrating the incorporeality of the psychic subject) is the decisive factor in favor of incorporeality. The proof of the incorporeality of the psychic subject, here presented only in brief outlines, will be reproduced in detail in another connection.

After each of the four proofs has led to the assumption of a creative principle, a simple and short discussion in the large lectures is supposed to make known the infinite perfection of this original principle. Later Brentano found this discussion to be not so simple, and in the "Train of Thought" the independence of the four proofs of the creator is also dispensed with.

In fact, the proof from motion and the psychological proof have to rest on the law of excluded chance even just to reach this stage. The teleological proof could sooner do without it since an accidental intelligence would explain the apparent order much more easily than an accidental non-intelligence would.

Thus for a variety of reasons a unified conception is to be preferred in which the different motives borrowed from the traditional proofs share in the labor and work together as a whole. I was therefore tempted to attach the concluding essay ("Train of Thought"), which contains such a unified conception, directly to the "Preliminary Inquiries" which end at Section 204. And another thought favored this. On the affirmative side Brentano's lecture notes present only the teleological proof in detail and in a formulation which is not repeated by his later investigations, whereas the psychological proof and the proof from contingency are minimally explained and move partly along tracks that were later abandoned. The latter holds also for certain passages in the proof from motion, although it takes up much more space in the lecture notes than the other two do. In the chapter, "Completion of the Proof of the Existence of God," which is supposed to lead from the creative intelligence to the infinitely perfect being, it later seemed to Brentano himself that the extent of our concept of creation was overestimated when moral perfection is there inferred directly from infinite creative power. This gap is filled by a later essay, "On the Moral Perfection of the First Cause of All Beings Which Are Not Necessary in Themselves," in discussions which are partly repeated in the "Train of Thought."

But if I did not decide to exchange the whole of the second major part of the large lecture for the essay, "Train of Thought," then the following considerations were decisive.

Above all, the classic presentation of the teleological proof, no essential points of which are repeated in Brentano's later discussions, could not be suppressed. Should it take its place in the "Train of Thought," where no fewer than a hundred and fifty pages would be inserted to replace three and a half? That would have forced open the structure of the graceful, short essay, destroyed its lucid conception. But leaving the teleological proof in its original place and striking out the other three on account of their dated versions in the lecture notes would have ruined the masterful construction of the lecture.

So I had to resolve to revise the three proofs that follow the teleological proof. I asked myself how Brentano would have carried them out if he himself had come to the point of publishing the large lecture. After a thorough study of everything the posthumous works contain on these problems, I have gathered together the most mature remarks from manuscripts and dictations, from letters and conversations, concerning which I could assume that Brentano himself would approve of their insertion in place of the outworn parts of the structure. Whether he would not have preferred this partial reconstruction to a new construction following the plan of the "Train of Thought" is not a question of any practical significance. He did not carry out the construction, but the reader may find its outline in the concluding essay of this volume.

In the first part of the book, in the preliminary inquiries, the work of the editor also could not be limited to the mechanical work of accurate transcription. For the first time in the publication of the posthumous works we do have to deal with lecture notes. As a rule it may be supposed that such notes, written down in mere catch phrases, leave most of the explanation over to extemporaneous delivery. Fortunately that does not hold true for this lecture. Considerable portions are stylistically perfected, though the parts he planned to expand upon during the oral presentation are so numerous that I could not always note them. Indeed it would have been pedantic to do so where the idea he had in mind was quite apparent. Where the editing made a difference this is noted. Unfortunately, some of Brentano's notes have been lost, but the notes of his pupil Marty were at my disposal.

The significant corrections were always with respect to points where his later teaching amounted to an improvement. Thus there had to be taken into account Brentano's altered position toward so-called *theologia analogica*, which will not allow the application of any of our empirical concepts to God, not even the concept of a being. Also Brentano would certainly have disapproved if some things had not been deleted; for example, in the chapter on the ontological argument, the old view that one can even have a thing which is not real as an object of thought, and the opinion that in words like 'existence' or 'possibility' we are dealing with names and concepts. He later saw that these are merely synsemantic terms and that possibilities, impossibilities, eternal truths can be made into things, particularly things independent of God, only in a fictitious sense. By this insight not only does the analysis of the ontological argument become clearer, but also metaphysics in general and the hypothesis of God's existence in particular are freed from all the disruptive remnants of platonic idealism.

Besides, conserving what was out-of-date would have made the study of Brentano more difficult for all those who have begun with the posthumous works since these give his teaching its most mature form.

In the "Preliminary Inquiries," the first part of the present volume, everything of importance which can be brought forth against the possibility of a rigorous proof of God's existence is given proper attention. The exposition and analysis of this with Hume and Kant comprises the outlines of an entire epistemology.

Where the text of the lecture had to be accommodated to Brentano's later work, there was often a choice to be made from among several versions. It will be possible to check on whether I have always made the right choice as soon as the entire posthumous works are known. There is much that I would have liked to revise again, but the thought of the abundance of material that the editors still have to cope with obliged me to bring to a conclusion the work expended on this volume--which was begun four years ago, though it was interrupted several times--especially since many have long awaited the appearance of this work and they are getting impatient.

When in doubt I was able repeatedly to confer with my friend Professor O. Kraus in Prague, who has just completed the sixth volume he undertook of the posthumous works. I am grateful to my faithful, volunteer assistant, Dr. Ernst Fordadori, for his self-sacrificing help in editing the galley proofs. My colleague, the botanist Professor Adolf Sperlich, had the kindness to review the text of the teleological proof and make many marginal notes on the passages having to do with biology. To all of them my heartfelt thanks.

The first mention of the lectures on the existence of God is to be found in a letter of Brentano to Marty on February 1st, 1871, where he says: "Stumpf tells me that you wish to have the logic for this semester. Unfortunately you will not find what you expect. In order to complete the metaphysics of the previous semester which was prematurely interrupted by the war, I let myself be talked into spending part of the time designated for logic on the proof of God's existence. And since I was thorough in this, as I am wont to be, the investigation extended to twenty-four hours. In particular I increased the number of considerations on the possibility of a rigorous proof and went into entirely new objections." The manuscript of this lecture is to be found in the posthumous works, but so are even older drafts that go back to 1867. The lecture notes were repeatedly revised. On the 6th of April, 1873 he reported to Marty that he had concluded his career at Würzburg by discussing the great questions in the philosophy of life: In metaphysics with the proof of God's existence; in the lectures on psychology with the question of immortality; in a seminar ("On Society") with the highest ethical considerations. A year afterwards he praises the eagerness of the Viennese students who follow psychology with the closest attention and flock to the lecture on the existence of God in ever greater numbers so that it has to be moved to the big lecture hall. A new draft of the notes on metaphysics dates from the year 1877. But the text of the present volume is put together for the most part from the manuscript of the year 1891. Yet between the quarto pages of this manuscript, written in violet ink, there are frequently to be found octavo pages from the older versions written with pencil and not infrequently already difficult to read.

Brentano indicates in the margin, where the lessons are numbered serially, how far he got in each individual class. Since these breaks do not correspond to real sections they could not be retained in printing. But a division into well-rounded lectures would have resulted in sections of too varied scope. So it is left over to the occasional direct address to the listeners to indicate the character of a lecture.

Brentano always placed high value on comprehensive descriptions of content to facilitate the overview. The one for the first part of the present volume, for the preliminary inquiries, and the one for the "Train of Thought" are his own. In numbering the paragraphs I allowed myself to deviate from the notes where the numbering is not consecutive but is rather carried through in pieces and frequently interrupted.

The criteria which have proved good so far have been applied in the footnotes. They are primarily supposed to contain what the reader needs for better understanding but cannot easily obtain except from a pupil of Brentano who is familiar with his entire teachings.

The appearance of this work occurs at a time when the educated are no longer as firmly entrenched in the materialistic outlook as they were in the years when the lectures originated. But another danger seems not inconsiderable, namely that of mysticism. For anyone to whom philosophy is a science and not a mere substitute for that, there can be only two possibilities in the question of God's existence, too,--either to abandon it or to construct a proof.

Innsbruck, Christmas 1928

Alfred Kastil

EDITORIAL NOTES
by
Alfred Kastil

1. Brentano later dealt with the subject of this introductory lecture in separate essays on the philosophy of religion. See *Religion und Philosophie* (Bern: Franke, 1954).

2. Positive truths are those which maintain the existence of the thing about which a judgment is made. Thus, for example, the propositions of the physicist and the psychologist. They accept certain things as existing, and the metaphysician traces them back to the first cause of all beings which is necessary in itself.

3. Hermann Helmholtz, *Über die Entstehung des Planetensystems* (Populäre Vortrage, Braunschweig: Vieweg, 1876).

4. Instead of section 4b, Brentano's lecture notes contain only the following words: "Though it is scarcely to be conceded that knowledge of the highest moral principles depends upon knowledge of God, yet it seems quite necessary to concede that a derivation with certainty of the most important more specific determinations is impossible without knowledge of God. The question of pessimism. Hamlet: To be or not to be." Without a doubt, Brentano dealt with this important subject in greater detail while lecturing. I have followed the notes I took on the lectures of my teacher Anton Marty, who undoubtedly reiterated Brentano's thought.

5. Hume, *A Treatise of Human Nature*, Book I, Part II, Section VI and Appendix.

6. Here the text has been adapted to the most mature form of Brentano's teaching. He later recognized that in speaking of an "existing" thing one is dealing with a word that does not have an independent meaning.

7. If someone swears that what he swears to is false, is he telling a lie or not? Both possibilities seem to lead to contradictions. In an as yet unpublished analysis of Russell's paradox (of the classes that are and are not predicable of themselves), Brentano gave the following solution: In order for someone to swear falsely, it is not necessary that each part of what he swears to be false, rather it suffices if what he swears to is false at one point. Now someone who swears that he swears falsely is saying two things, namely that what he swears to is true (for everyone who swears to anything says that) and that what he swears to is false. So it is clear that

he has sworn falsely, although it is just as clear that not every part of what he swears to is false.

8. Many speak of what is accidental but agree only in the word and not in the thing. Some hold that there could be something which is neither directly nor indirectly necessary, and they call it "absolutely accidental." Others allow the accidental only in the sense that it is without direct necessity, and they call this indirectly necessary thing accidental in the sense of contingent. Brentano rejected the former as contradictory.

9. Sections 50-53 are taken from my notes on conversations with Brentano in Florence, 1908, and Innsbruck, 1914.

10. On knowledge and the belief in science, compare Brentano, *Religion und Philosophie*. There it is argued that the educated participate as believers in the results, and thus also in the blessings, of the other sciences, but that in philosophy the time for this has not come yet as long as there is no unified philosophical theory. And the philosophers' disputes get in the way of their authority as far as the lay people are concerned, or rather shake it yet again.

11. When Brentano speaks here of analytic existential propositions, he means negative existential propositions, i.e., those that reject something as impossible on the basis of the concept. (There is no square circle.) A positive, analytic existential judgment could only be made by someone equipped with the sufficient concept of the directly necessary being. For him, "God exists," would be an analytic judgment.

12. We do not possess absolute concepts of individual places or points in time. The spatial or temporal positions of the things we think of are therefore always thought of by us through relative determinations. As for example something stands apart from another thing at a certain distance and in a certain direction. Therefore it may be said *a priori* with certainty that all attempts to construct geometry without the concept of direction are possible only because they use that concept covertly, without being conscious of it.

13. According to Brentano, our intuitions are universal and indeed this goes for both the outer intuitions and the inner intuitions. The former are universal because no specific, absolute determinations of place appear in them. The latter are universal because they contain nothing by which my "I" as such is distinguished from any other.

14. Compare the difference in the way we are aware of the movements of the second hand and the minute hand. The former we see, the latter we infer.

15. Sections 90b and 91-94 are according to later dictations.

16. What is meant is the proposition that the arc of a parabolic conic section is two-thirds that of a parallelogram having the same base and height.

17. A metaphysical whole is an accident (e.g., one-who-thinks), which includes the substance (the I) as a part. A logical part is a concept of a species (red-thing) which includes the concept of a genus (colored-thing) as a part.

18. A fiction for two reasons, because there are no colors,* and if there were the passage from one simple quality to another would have to be through other mixed colors.

19. If, for example, a soul could come to be now, uncaused,without being in competition with something else. One body cannot be in the same place as another.

20. If, for example, a white speck could suddenly come to be uncaused on a blackboard; but likewise instead of it there could be a speck of any other color you like (one of infinitely many possible shades). Or if a rolling ball could come to rest without a cause; but likewise it could deviate in any direction from rolling straight.

21. If, for example, a place occupied by nothing until now were, without a cause, suddenly to become red, or an unconscious soul were to think of a particular number (one among infinitely many conceivable numbers). Here the thing which comes to be without a cause would not take the place of a previously existing, positive object.

22. The last paragraph of section 146 has been added by the editor to harmonize with Brentano's theory "On Genuine and Fictitious Objects." See *Psychology from an Empirical Standpoint*, (New York: Humanities Press, 1973) pp. 291 ff.

23. The third, fourth and fifth paragraphs of section 153b (as also the second and third paragraphs of section 51 above) have been changed by the editor to correspond to Brentano's later teaching. The lecture notes

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* Only colored things. (Tr.)

contain at both places discussions that are closer to the standpoint of the so-called analogical and negative theologies.

24. It is questionable whether the imperfection of our concept of God is taken sufficiently into account here. Brentano himself repeatedly emphasized this imperfection, and in particular pointed out that it is not sufficient even to make us recognize the possibility of its object.

In Brentano's papers there is much to be found which points to a later revision. In opposition to the view expressed in section 167, that each of the four arguments is a perfectly sufficient proof of God's existence, not requiring verification by the others, the later view is that the step from creator to God cannot be made without teleological considerations.

In this volume, the inference from the creator to the infinitely perfect being, to God, is given in both versions, the older one beginning at section 465, and the later one in the concluding essay, sections 17 and following.

With respect to the consequence of this revision for the answer to the objection that the concept of God is infinitely complicated, it surely suffices if one holds to the point that this concept of God does not collapse with the concept of the *ens realissimum*.

But not every complication can be denied. If each of the characteristics from which we construct the concept of God has the probability of one-half, then the probability of the whole results by multiplication. One will find in section 353 that it is sufficient if the unconditional probability of the theistic hypothesis is not infinitely small.

25. Later Brentano himself preferred a unified proof procedure, comprehending all the themes. See the essay, "The Train of Thought in the Proof of God's Existence," (referred to as, "The Train of Thought") at the end of this volume. According to that essay it is not exactly a matter of independent proofs, but of several stages within a proof, the foundation of which is formed by the so-called proof from contingency.

26. In order to avoid misunderstandings, let it be remembered that like Aristotle Brentano also held that neither an actually infinite multiplicity of discrete things, nor an actually infinitely large continuum is possible. On the contrary, no matter how large either one is thought to be, no boundary is ever reached beyond which a still larger one would not be possible. Space, too, the continuum of places, is finitely large at each moment, but never so large that it could not be still larger. There are infinitely more possibilities for the positioning of bodies, therefore, than there are conceivable cases of contact among them.

27. When Brentano drafted this lecture, the science of genetics was still in its beginnings. But on the basis of data and free intuition some scientists, as for example, Nägeli and Weismann whom Brentano quotes, had

expressed the view that all the characteristics must be present already in the seeds. This was before the experimental verification by Mendel and his followers, and paved the way for the appreciation of Mendel's results.

28. Here "mechanical" means "proceeding without direct teleological intervention."

29. Brentano also calls this proof the proof from eternal energy.

30. Further on (section 413) a qualification is made. Not every kind of change serves as a foundation for the argument but rather only such alterations as admit of different velocities. Thus not temporal change as such, but only a change in time that proceeds in such a way that in the same period of time different degrees of difference could be achieved. This qualification is important because, as Brentano later demonstrates, even the first mover cannot be thought to be free from an absolutely steady change.

31. Part of the first argument (sections 390-394 and 398-407) follows the lecture, "The Law of Entropy and its Significance for Metaphysics," which Brentano gave in 1868 in Würzburg and in 1879 in Vienna. Hence the repetition in section 405 of something that was already established in section 397.

32. Sections 414-418 do not contain the text of the lecture notes but rather Brentano's later teaching. At first Brentano shared the Aristotelian conviction that the first, directly necessary principle is absolutely changeless. In the proof against a motion with no beginning there does appear already to be a reference to the exceptional case of alteration that is not capable of variable velocity. But at that time Brentano had only thought of time, without considering that the divine existence also proceeds temporally.

33. Its impassibility, i.e., the impossibility for it to experience an influence, results from the direct necessity of the first cause, thus by borrowing from the proof from contingency. But from the old, Aristotelian standpoint it was inferred from its absolute immutability.

34. The version of the proof from contingency which is required in the context of the large lecture makes use in part of Brentano's works from later times. Thus sections 426 and 427 are taken partly from a letter to Christian von Ehrenfels and partly from an undated fragment. Sections 430-432 are taken from an essay, "The Impossibility of a Pure Matter of Fact," which has already been published in *Versuch über die Erkenntnis* (Leipzig: Felix Meiner, 1925).

Sections 412, 413 and 415 are from my notes on a conversation with Brentano in Innsbruck, 1915. Sections 414 and 435 are taken from the concluding essay of this volume, "The Train of Thought."

There is an interesting version of the proof from contingency in a short fragment which comes from the period 1906-1908, to judge by the handwriting of the secretary:

> 1. What is called contingent in the strict sense is what is neither necessary nor impossible, and so can either be or not be. For what is not impossible can be, and what is not necessary can fail to be.
>
> But the expression, "necessary," does not mean the same as "certain," and the expression, "impossible," does not mean the same as "certain not to be." Otherwise "contingent" would mean the same as "something concerning which I know neither that it exists nor that it does not exist"; and the same thing could be contingent for one person and non-contingent for another, namely when the latter has more factual knowledge than the former.
>
> Rather it may be said that what is impossible is that the concept of which is of such a kind that whoever accepts the object judges absurdly. And what is necessary is that the concept of which is of such a kind that whoever denies the object judges absurdly.
>
> 2. Nevertheless, viewed precisely nothing is contingent in this sense. There is nothing which is absolutely accidental. Everything that is is necessary when it exists, and everything that is not is impossible when it does not exist. The single distinction that can be made among the things that exist is that one is without a cause and another is determined to be necessary by a cause such that without this cause it would neither be necessary nor be. And among those things which are impossible one is directly and another indirectly impossible. A thing would be indirectly impossible because the indispensable cause of it was missing, although if the cause were given the thing itself would be given as a result of it.
>
> Thus everything which is caused is contingent in this sense.
>
> 3. But even if we stick to the concept of the contingent in the sense of "what is neither necessary nor impossible," it can be of use to us. If we show that nothing corresponds to it, then we establish a truth which is of high importance. This very demonstration can be made the starting point of a proof of God's existence, which proof would of course be better called the proof from non-contingency rather than the proof from contingency.

35. Under the degrees of teleiosis Brentano understands the difference in the extension of a secondary continuity over the primary continuum which it occupies. Every motion provides an example. If the same path is traversed in twice the time, then the body acquires a higher degree of

teleiosis at each point along the way than it would have if the motion proceeded more quickly. A body at rest has full teleiosis.

36. The lecture notes contain only a brief sketch of the psychological proof which dates to the time at Würzburg when Brentano still shared the semi-materialistic view of Aristotle. I have put the text together according to the dictations from the last years of Brentano's life. One of these essays, "On the Immortality of the Human Soul," Brentano composed for a small circle of friends in Zürich who were interested in philosophy.

37. Different parts of the body are individually different from each other; they can have like characteristics, but not the same ones.

38. If like things were to produce different effects under like circumstances, then this would be unexplainable. They seemed not to be indirectly necessary and since, being effects, they also could not be directly necessary, they seemed to be absolutely accidental. But since the absolutely accidental is impossible, so is indeterminism. Compare *Zukunft der Philosophie*, pp. 178 ff.

39. This chapter, the oldest part of the lecture notes, is partly repeated by arguments in the final essay of this volume, "The Train of Thought in the Proof of God's Existence," 1915. All the same, I could not bring myself to suppress it because then the basic outline of the course of lectures would be wiped out. Also it is certainly very interesting to compare the first attempts Brentano made, even before his separation from the church, with the most mature form that his thinking assumed on the fundamental religious question, the question of all questions. For this wise man, thinking about God was "life" in the highest sense of it up to his last breath, and we who have acquired from him the light of the knowledge of God may trust that it has remained so in that place where he has gone before us.

40. That is logically possible the non-existence of which does not result from its concept, where the concept is taken to be complete and the analytic power sufficient. In opposition to Hume and Kant, Brentano repeatedly stressed that not everything that is not contradictory can pass as being possible.

41. The impassibility follows from the direct necessity.

42. Brentano gave me this essay in Zürich in 1916, but with the remark that he intended to rework it again. But it never came to that, since he died a few months later. I have left the text unchanged except for a transposition that Brentano himself wished, namely, I took sections 6 and

7 from the note to section 4 where they occurred in the dictation. Further, I deleted two points, one from the same note (which included an abandoned argument against the possibility of an infinite series of secondary causes), the other from a note to the next page having more detailed discussion of the solution to Bertrands' chord problem. I inserted the sub-titles which make the overall course of the proof easier to see.

43. After "necessary," add for the sake of completeness, "and directly evident as being necessary, i.e., certain." For the opposite of probability is certainty, not necessity.

44. The law of non-contradition says that one and the same thing cannot both be and not be at the same time. One who accepts the earlier thing and rejects the later does not contradict himself.

45. Only a directly necessary being, i.e., only God, could make an evident judgment with apodictic modality concerning an object. Apart from God no other being is conceivable as subject of this acceptance since he is the only one who has the presentation or perception sufficient to it in that he perceives himself.

46. It is a matter of the so-called double judgment, i.e., genuine predications such as, e.g., "This flower is a rose," in which a thing is accepted (subject judgment) and to this accepted thing something is attributed (predicate judgment). The predication is inseparable from the acceptance, that is, it cannot occur in isolation. The words, "is a rose," yield no sense taken by themselves. In the other hand, "This flower," expresses a complete judgment which accepts a definite thing.

47. For each place it would be equally probable that it be empty as that it be occupied, and yet at the same time it would be infinitely more probable.

48. Because if the physiological process belonging to it disappears, so does the psychic act.

49. Each duration is a quantity, and what has quantity has parts, and naturally they are somehow different from one another. If the thing which endures for a time is changeless in every other respect, still it has to keep pace with the changing point in time. So, just as a corporeal substance cannot be extended in three dimensions without varying point by point, i.e., place by place, so it also can have no duration without occupying different specific points in time one after another successively.

50. Suppose that a god were to have before his mind all the absolute points in time of the course of the universe at once, but did not recognize

each of them successively as future, closer to the present, still closer, etc., then as present, then as past, farther in the past, still farther in the past, etc. Such a god would certainly know the whole history of the universe in every detail, but would not know how long it has gone on so far.

51. This paragraph contains a brief overview of the proof carried out in the preceding lecture, "On the Existence of God," which showed that Darwinism is not able to explain either the appearance of teleology in general or evolution in particular. There the reader may find a more thorough discussion of each sentence in this overview.

52. The substance spoken of here is none other than unified, finitely extended space. The bodies to be found in it would be "in it" the way a quality is found to be at a place, i.e., each body would include the part of space belonging to it as its substantial support.

53. John Locke, *An Essay Concerning Human Understanding*, Book IV, Chapter 10.

54. Descartes' doctrine that the being of the mind consists in thinking.

55. If an isolated spatial object surrounded by nothing were to move, then that would be a substantial change according to Brentano, insofar as by its movement places that existed earlier would be annihilated and new places would accrue to the object. Motion is to be construed differently when a quality within a spatial continuum (spatial thing) is displaced from one part of the substance to another. Then a substantial thing, namely the places, undergoes an accidental change.

56. Namely the abundance in the unity of the divine thinking which corresponds to the multiplicity of parts of the world.

57. Since Brentano teaches that there is a temporal beginning of the world, this remark can only mean that the future has no conclusion while the past duration of the world grows in extension without end. Neither the latter nor the former contradicts the impossibility of a completely infinite extended thing, since the impossibility affects a thing that is, i.e., that is present at some time. What was and what will be is not.

58. Samuel Clarke, *A Demonstration of the Being and Attributes of God* (London: 1705).

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